AUG 2 1944

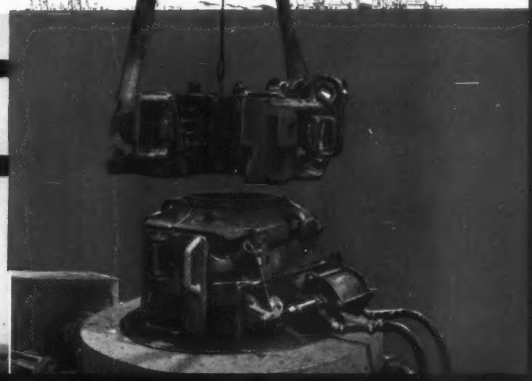
CALIFORNIA
OIL WORLD

TWICE MONTHLY • SECOND ISSUE • JULY, 1944

15,278 Feet Cased with a BJ Slip Grip Elevator and Split Casing Spider

ALMOST THREE MILES of 5½" O.D. casing was floated in and set in Phillips Petroleum Co.'s Ada Price No. 1 with the tools here shown in actual use while the casing was being run. Both equipped with full length slips—any chance of crimping the casing was eliminated and again a new bottom hole record was established.

A CLOSE UP of both the Slip Grip Elevator and the Split Casing Spider used by Phillips, except that Spider is equipped with a hydraulic mechanism for raising or lowering of slips. Operated with water, steam or air—at rig pressures and from any point on derrick floor—dangers encountered when casing is being tailed into the derrick are eliminated. Both Slip Grip Elevator and Spider are hinged for easy removal. *Ask your B.J. man about these tools . . . or consult Composite Catalog.*



BYRON JACKSON CO.

Houston • LOS ANGELES • New York

THERE must be no time out now for balky, troublesome drill pipe—no precious minutes to be lost when all the world is waiting for American oil so greatly needed for Victory.

Use the round-the-clock, 24 hour-a-day team of SPANG Shrink Thread Drill Pipe and NATIONAL Shrink Thread Tool Joints to keep your rig operating steadily, smoothly, *profitably!*

Here are the advantages . . . the double economy—you get from Spang Shrink Thread Drill Pipe and National Shrink Thread Tool Joint :

1. **ELIMINATES** last engaged thread failures through the use of broad flat-profile threads.
2. **ELIMINATES** leakage and wash-outs through pipe threads by patented taper seal between drill pipe and tool joints.
3. **ELIMINATES** creepage during drilling and galling of threads during application by the shrinking on process.
4. **REDUCES** Tool Joint renewing costs. No bucking-on machine is required for renewal—no rethreading of pipe—or re-chasing of threads is necessary—and there is no heavy trucking expense involved. With Spang Shrink Thread Drill Pipe and National Shrink Thread Tool Joints, the renewal job is done on the job—right at the well—double economy.

Specify SPANG Shrink Thread Drill Pipe and NATIONAL Shrink Thread Tool Joints to help you prove out faster, more dependably, more economically!

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CALIFORNIA
OIL WORLD

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FOR TIMELY, COMPLETE
CALIFORNIA OIL NEWS COVERAGE

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July 28, 1944
Telephone Number TUcker 2571

Carrington King

Increased production from structures underlying the tidelands of California will be the next step in a program to lick the serious crude oil shortage in the Pacific Coast region, if State officials are receptive to a new and urgent plea from Washington to inaugurate a new directional drilling program in the Los Angeles Basin area and off the shore of Santa Barbara and Ventura counties.

Concerned over the critical California crude oil situation, Deputy Petroleum Administrator Ralph K. Davies, on July 15, appealed to the California State Lands Commission to "take every action possible . . . for still further development of offshore oil pools by that type of directional drilling which has proved so successful over the past 10 years."

Admitting that amendments to certain existing statutes may be necessary, before an expanded drilling program can be pushed to capacity, Davies urged that everything possible should be done within the limits of existing laws and that the needed amendments be sought from the State legislature. He assured the Commission that testing and development could begin without damage to California's beaches and without interference to navigation and fishing.

"The situation as respects crude oil supplies in California has become so critical that only recently the Congress of the United States authorized the Navy Department to develop and produce the Elk Hills Naval Oil Reserve," Davies said in a letter to the Commission. "The prospective demands for oil to wage the war in the Pacific are necessarily so enormous that even the development of the Elk Hills coupled with the sum total of all production which we may reasonably expect from known fields in California still leave us short of adequate supplies to sustain our military forces without drastic and increasingly severe civilian rationing."

Interesting to California oil men was a reference in the Davies letter to a letter written Oct. 19, 1943, to the State Lands Commission by Dr. William B. Heroy, then PAW Director of Reserves and now Director of the Foreign Production Division, directing attention to the possibilities of expanding production in the tideland areas of California. Davies could not recall that the Commission took any action on the request or that the letter was answered in any detail. He told CALIFORNIA OIL WORLD, however, that he believed there had been an "acknowledgment" from the State lands group.

Reviewing structures which appear favorable along the Southern California coast, Davies specifically mentioned a "particularly well-defined structural trend in the Los Angeles Basin area extending from the important Torrance and Wilmington fields in a southeasterly direction and joining with the Huntington Beach field and extending perhaps as far as Newport Beach." Other promising structures lie along the Santa Monica Bay shore line and immediately off the coast in Santa Barbara and Ventura Counties, he said.

. . . Mention of California's prized tidelands will cause a prickling sensation along the spines of those who remember the battle, in the late '30's, over ownership of lands lying between the high-water tidemark and the three-mile Maritime limit. Egged on by Senator Gerald P. Nye (R., N. Dak.), who several times introduced legislation authorizing the Department of Justice to establish title to the tidelands in the Federal Government, members of the House and Senate wrangled with their colleagues from the seaboard states over the question of State vs. Federal sovereignty. Since at least one of the several Nye bills was directed exclusively against California, the California oil industry is particularly allergic to the subject.

Nothing in the Davies letter can be construed, however, as the "entering wedge" which oil men have been expecting ever since the Justice Department seemingly lost interest in California's tidelands. Private enterprise should be able to handle the drilling program, Davies indicated, and the PAW certainly has "no designs" that would lead to Government interference of any sort.

Copies of the letter were sent to Rear Admiral Carter, executive of-

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This scene, in all its grim reality, is being enacted every day on battle fronts all over the world. One of our boys is down—and Blood Plasma is all that stands between him and the Great Beyond.

Where did they get the plasma that may save his life? No one will ever know. It might be from *you*—if you are one of the thousands of fine Americans who have donated to the Red Cross Blood Donor centers.

The men and women supplying this blood are CITIZEN SOLDIERS—members of the vast army at home that is backing our boys to the limit, not only by blood donations but in scores of other ways. A few of them are listed here. Check your own activities as a Citizen Soldier. If you can do *more* than you are, then choose another service and enroll today!

Your nearby Helpful Associated Dealer is doing an important war job today, helping to keep your car rolling for the duration. His skill and experience, plus famous Veedol Motor Oil, Veedol Safety-Check Lubrication and the many helpful, free Associated services, are at your disposal to "Care for Your Car for Your Country."

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ficer of the Army-Navy Petroleum Board.

* * *

While oil men in other producing areas are busy scanning the list of field increases certified by the Office of Price Administration—preparatory to the start of the Administration's stripper well subsidy plan on Aug. 1—California, so far, has not been certified because of an alleged failure to supply the OPA with the necessary information.

OPA says a wire was sent to R. D. Bush, State Oil and Gas Supervisor at San Francisco, requesting data on production and producing wells in the various California fields. They were referred by Bush to the Petroleum Administration, which stated it did not have the data required. After a second wire to Bush, a meeting was held with PAW officials and it was found "the information was such that we could not work with it at all," an OPA spokesman told CALIFORNIA OIL WORLD.

The price agency says it "had no alternative" save to omit California entirely from the list of certifications. It is "quite possible," however, to get California on the list by the August 1 deadline, if accurate reports are received, an official said.

While OPA did not want to be quoted on the number of stripper wells in California, it was admitted there are not very many in the State and that there are only from 10 to 15 pools ("maybe more, maybe less") eligible for price increases set up under the subsidy plan. The multiple zone situation is "one of our particular problems," an OPA official declared, although in other areas where the oil appears to be segregated it is treated as a separate pool—if it produces less than 9 B/D.

Answering the hypothetical question of what action OPA would take in the case of a 1000 B/D well and a 9 B/D well producing from the same pool, the official said no premium would be allowed. The large producer would disqualify the pool, he said.

Various reasons were given for California's failure to qualify for certification under the subsidy plan. In some quarters the blame was placed on the California operators for not submitting to OPA accurate data to be used as a basis of determining which fields are eligible. The OPA obviously is holding PAW responsible for not producing the required information—but this, perhaps, is understandable in the light of PAW's long-standing attitude of disapproval toward the subsidy idea.

Clarification of the California subsidy muddle probably will have to come from the West Coast.

* * *

With the Chicago conventions draining the Nation's Capital of news and news sources, oil observers have been watching hopefully for the arrival of the top-flight petroleum delegation from Great Britain—headed by Lord Beaverbrook—and the resumption of Anglo-American negotiations slanted toward a program of international cooperation in the development of foreign oil resources.

Charles Rayner, State Department petroleum adviser and chairman of the group of American oil experts who attended the preliminary set of conferences with the British, told this writer that the initial negotiations had progressed remarkably smoothly and praised the "very capable, broad-minded group" sent over from Great Britain.

The new British delegation—which Rayner said would take the conferences to a "Cabinet level"—comprises: Beaverbrook; Sir William Brown, Technical Adviser; Richard Law, Minister of State; Geoffrey Lloyd, Chairman of the Oil Control Board, and Ralph Assheton, Financial Secretary to the Treasury.

The committee appointed by President Roosevelt to conduct the negotiations for this country will be headed by Secretary of State Hull, as chairman. Its other members are Secretary of Interior Ickes, vice-chairman; Secretary of Navy Forrestal; Under Secretary of War Patterson; Deputy Petroleum Administrator Davies; Charles E. Wilson, executive vice-chairman of the War Production Board, and Rayner.

Meeting in Washington probably before the end of this month, the British and American delegates are expected to work out the agenda within approximately two weeks of the resumption of the discussions. If their report is accepted, it will be followed by an executive agreement, a joint resolution, or a treaty, Rayner predicted. Announcement of the final agreement will come from Washington and will be followed by ratification by both countries.

Great care is being taken to keep the Maloney Committee—the powerful Senate oil investigating committee, recently appointed but still to hold its first hearings—advised with respect to the international discussions. The Senate Foreign Relations Committee also is receiving information from the State Department.

Despite recurring reports that the trans-Arabian pipeline project—devised by Petroleum Administrator Ickes, and originally to be financed by the U. S. Government—has been sunk without trace, there are indications to the contrary.

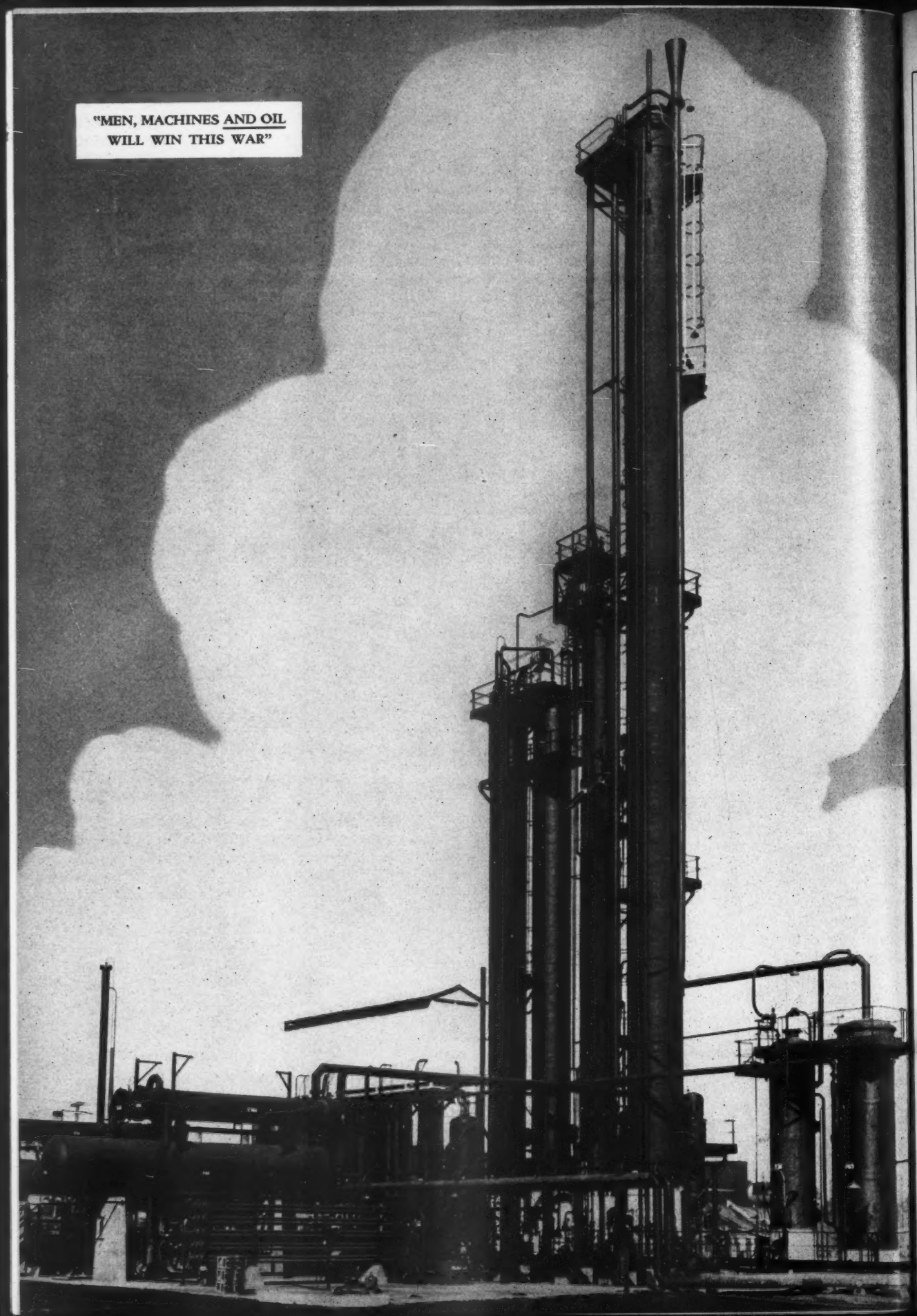
Asked whether the pipeline—assuming it is built with the funds of private companies, rather than with Federal money—would be assured of Government protection, Rayner said it would receive "diplomatic support". The genial State Department official, who for many years was in charge of marketing refined products for Standard Oil Co. of New York, with headquarters at Singapore, is an ardent supporter of the Department's policy of actively aiding United States petroleum interests in their problems abroad.

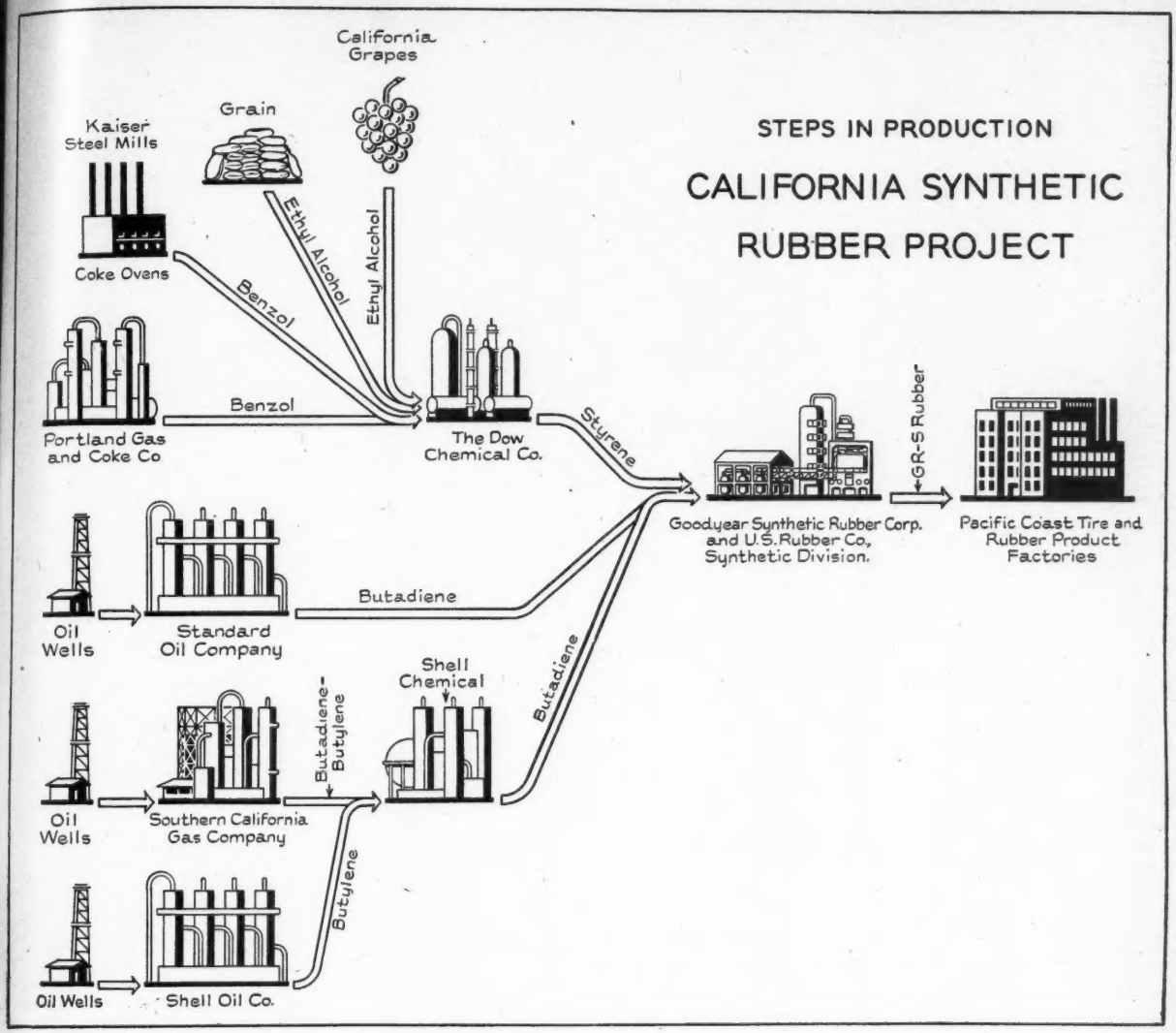
The possibility of defining the pipeline as a common carrier also has been discussed. This would permit certain British interests in the area to use the line, and prevent its exclusive use by the American companies with Saudi Arabian concessions (Arabian-American Oil Co., subsidiary of Standard of California and the Texas Co., and Gulf Oil Corp.).

* * *

Petroleum Industry War Council—just starting its July meeting, as this is being written—points with pride to the manner in which the American oil industry responded to the "challenge of oiling the allied invasion of Europe . . . to smash a series of production records" during June.

(Continued on Page 40)


"MEN, MACHINES AND OIL
WILL WIN THIS WAR"



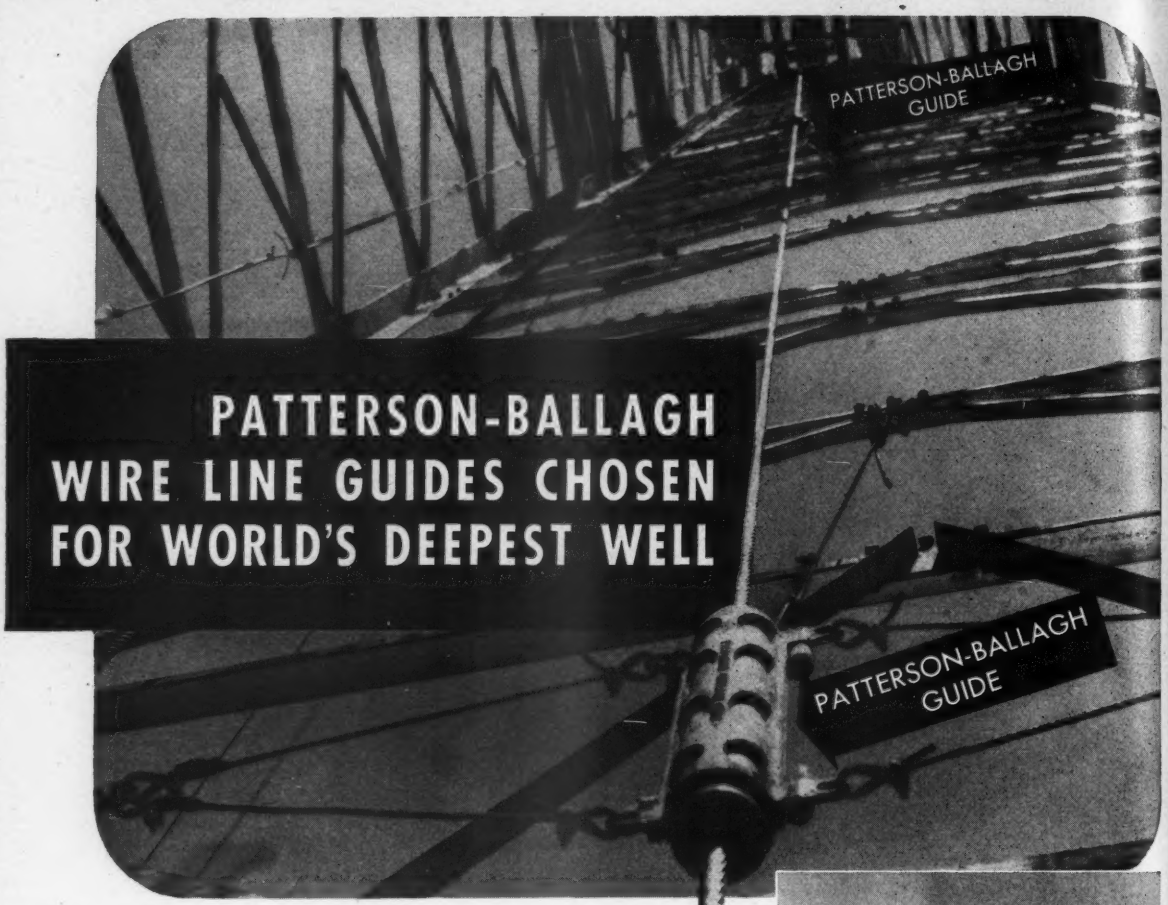
California's Great Synthetic Rubber Project Is a Highly Integrated Chemical Process

At its rated capacity project will be able to make set of tires yearly for every automobile on West Coast

Covering about 250 acres, the California Synthetic Rubber Project consists of six operational plant units. The Southern California Gas Company, the Standard Oil Company of California and the Shell Chemical Division of Shell Union Oil Corporation produce and refine the butadiene, the Dow Chemical Company makes the styrene, and the Goodyear Synthetic Rubber Corporation and the United States Rubber Company combine the two materials into synthetic rubber in three co-polymer plants.

Six plant units, linked together in a continuous production flow, comprise the Southern California Synthetic Rubber Project. The several units are described in the series of articles which follows.

At its rated capacity of 90,000 tons annually, the California project will produce enough rubber to



PATTERSON-BALLAGH WIRE LINE GUIDES CHOSEN FOR WORLD'S DEEPEST WELL

Emphasizing the acceptance of Patterson-Ballagh Wire Line Guides throughout the oil industry is the selection by Phillips Petroleum engineers of this equipment for use on their Pecos, Texas, record breaking, three mile deep well.

Fatigue, corrosion, kinks, strand separation and surface wear are factors contributing to wire line failure. A Patterson-Ballagh Guide below the crownblock reduces surface wear and "whip," and a second guide above the draw works insures correct "spooling." For utmost in protection of wire rope, two guides are recommended by most engineers.

Inexpensive refills, the only part that wears, are long lasting and wear-resistant. Now made of synthetic rubber, known as PBX. Detailed information will be promptly supplied.

See Composite Catalog

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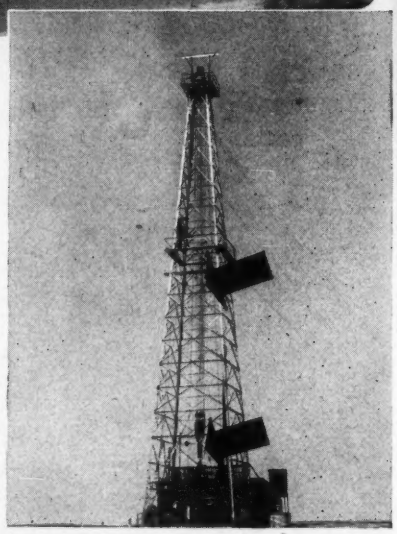
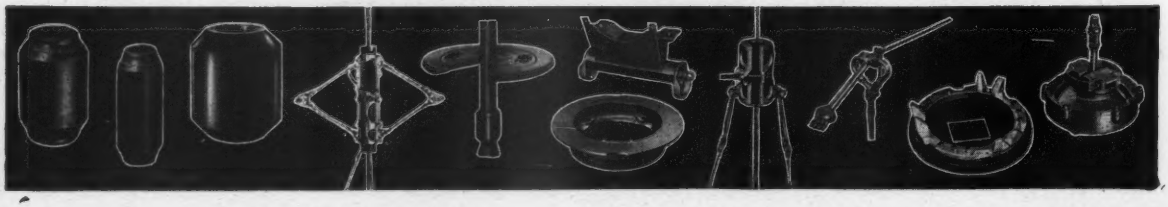
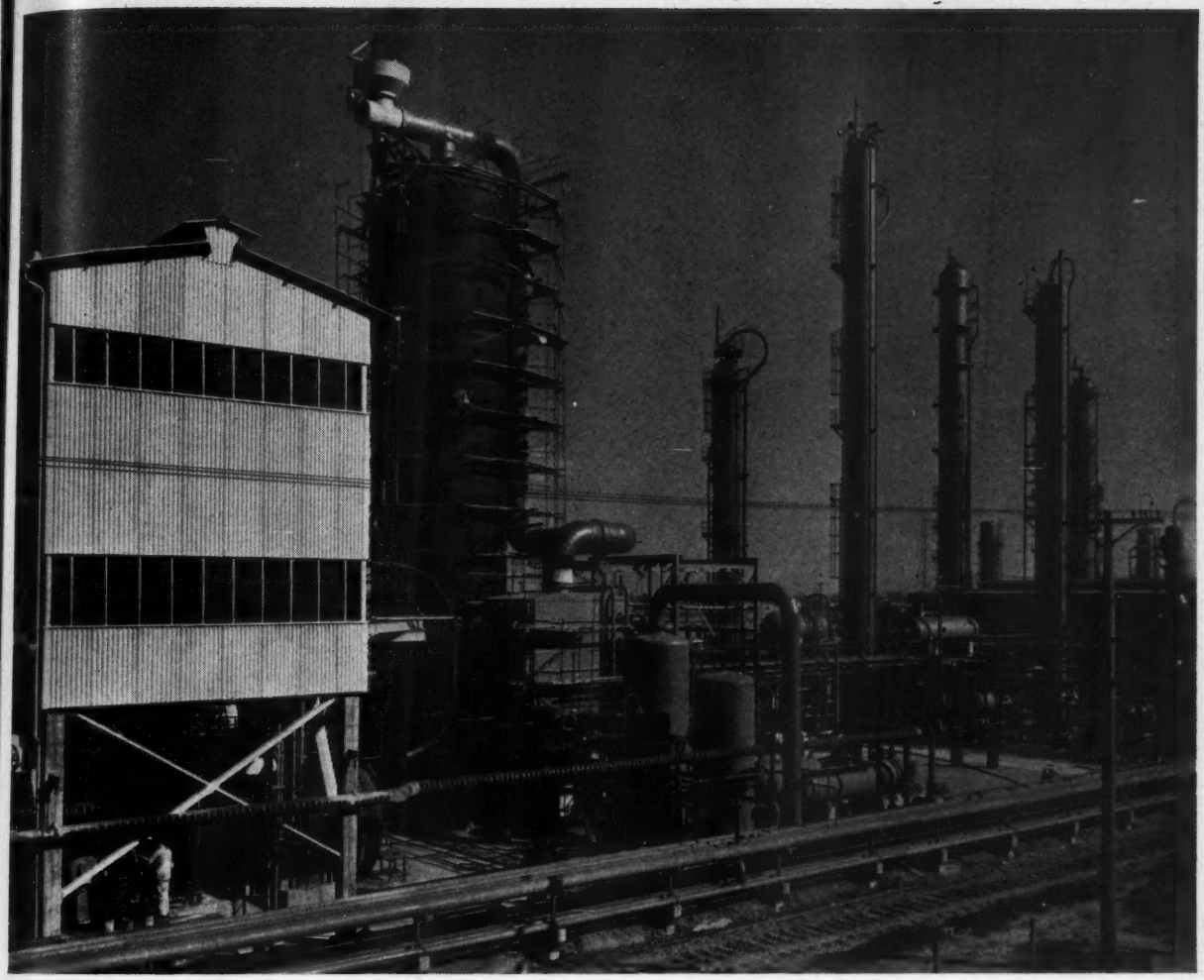


View of the Phillips Petroleum Company's record breaking well in Pecos County, Texas.

PATTERSON-BALLAGH WIRE LINE GUIDES





Catalytic Dehydrogenation Unit which splits butylenes into butadiene and hydrocarbon. Butadiene is used in the manufacture of synthetic rubber and hydrogen in the manufacture of aviation gasoline in a nearby refinery.

make 54,000 passenger tires daily, or one set of tires yearly for every automobile on the Pacific Coast, if all the rubber were used for this purpose.

The estimated national production of synthetic rubber under the government's program is 765,000 tons annually of the all-purpose Buna-S type of synthetic rubber, as against a normal peacetime consumption of 650,000 tons of natural rubber.

The California project is a highly integrated chemical process in which the individual plants operated by the six companies, all located in the Los Angeles area, are linked together in a continuous production flow from petroleum, benzene and alcohol through butadiene and styrene to polymerization units which make the Buna-S, or GR-S (Government Rubber-Styrene Type).

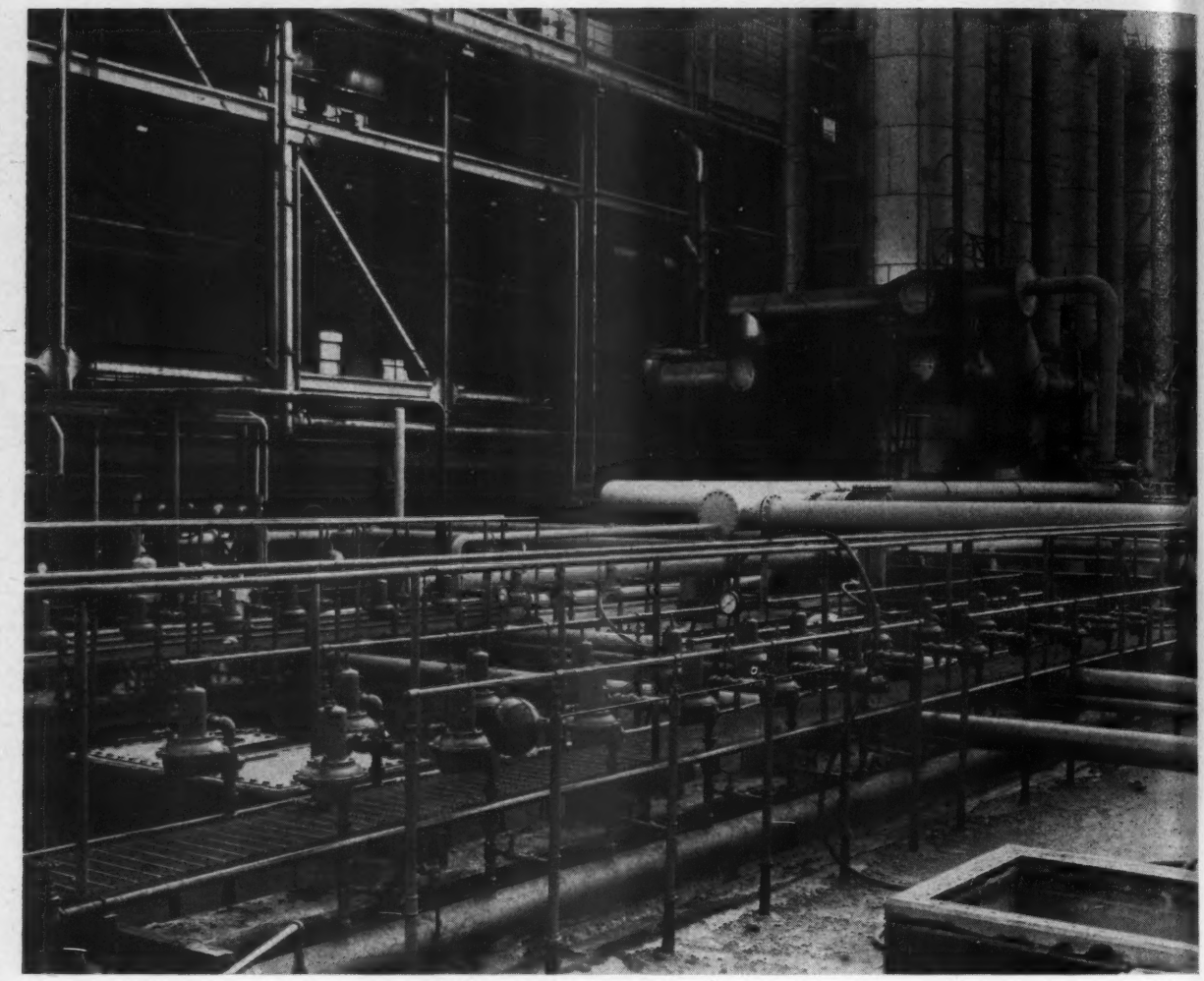
The raw butadiene stocks produced by the Southern California Gas Company from petroleum flow to the Shell Chemical plant where the butadiene is extracted and purified. It is then compressed into liquid form and piped to the two rubber companies. Shell Chemical also operates a unit, which converts the residue from the extraction to butadiene. An additional supply of butadiene comes from a new Houdry type plant operated by the Standard Oil Company of California at El Segundo; the butadiene produced there goes directly to the rubber plants in pressure type tank trucks.

Dow Produces Styrene

The styrene, made from alcohol and benzene by the Dow Chemical Company is pumped through pipelines to the rubber companies' synthetic units' storage tanks. From these tanks the two basic materials go to the reactor areas where, through chemical reactions controlled by various chemical agents, heat, timing and pressure, the molecules of styrene and butadiene are polymerized.

In the polymerization process approximately three parts of butadiene combine with one part of styrene to make the rubber molecule. The remaining part of the process is a matter of distilling off surplus uncombined butadiene and styrene, coagulating the latex, filtering, washing and drying the resultant rubber. It is then weighed and pressed into 75-pound bales, ready for the products factories.

The various plants in the project are described more in detail in the ensuing articles.



Reliance regulators used in fume control installation

Gas Company's Plant Supplies C_4 Fraction

In the Spring of 1942 the Southern California Gas Company offered its 6¼ million dollar standby manufactured gas plant to the Government for butadiene manufacture.

Briefly stated, the process consists of cracking naphtha, or low grade gasoline, and obtaining a petroleum fraction composed of various hydrocarbon chains containing four carbon atoms. In the industry this is called a "C_4 cut". The constituent gases include butane, butylenes and butadiene.

The crude butadiene and butylenes or C_4 fraction are recovered by conventional gas absorption methods, from the gases produced from the petroleum vapors and are sent by pipeline to the Shell Chemical Company for purification.

The other ingredients obtained as by-products are used in the manufacture of fuel gas, fuel oil and aviation gas.

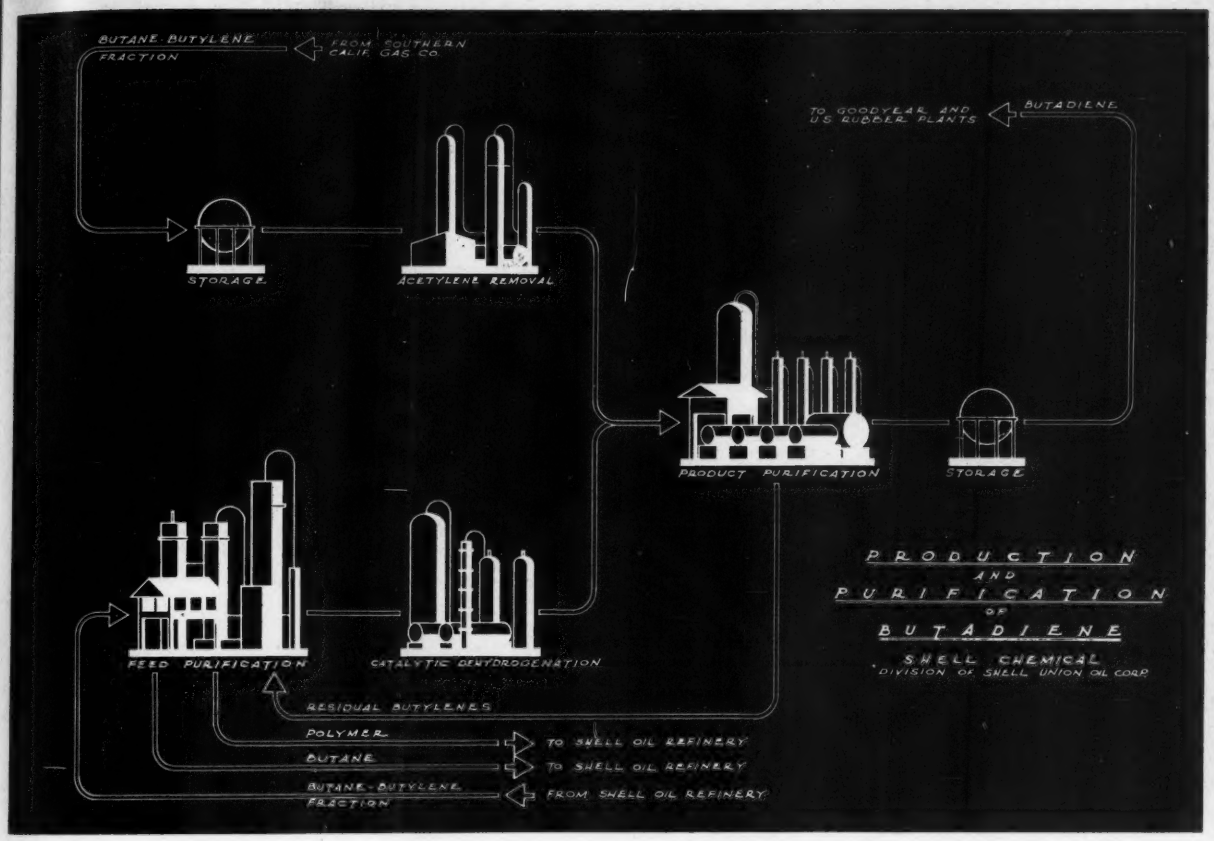
The raw materials for the process are obtained from refineries of Shell, Associated, Wilshire, Texas, Union Oil, General Petroleum and Standard Oil Company of California.

The generator plant consists of converted oil cracking units—some of the largest in the country. These units operate in pairs. Alternately, one of a pair is heated to a cherry red with by-product residue gas or fuel oil, while the other is cooled by vaporized oil distillate and steam during the conversion of the oil to butadiene and blend stocks. Each pair has a preheater which reduces the fuel requirement for the generators twenty per cent. While first one and then the other of a pair is heating, the stack gases enter the preheater and supply sufficient heat to vaporize the oil distillate.

Some of the liquid products are processed in the stripping plant to recover traces of butadiene.

The concrete tar separators and flotation cells are new equipment. The tar separators retain the liquid products and water from the generator plant long enough to effect a separation due to their difference in

(Continued on Page 27)



Shell Chemical Company Makes Butadiene

Five separate organizations are involved in the California synthetic rubber project. Southern California Gas Company receives straight run naphtha from the refineries of Shell, Associated, Richfield, Wilshire, Texas, Union and other petroleum companies. This naphtha is cracked in regenerative furnaces (sometimes called stoves) which had previously been used for standby gas purposes. By treating the effluent gases from the furnaces in an absorption and distillation plant, a C_4 fraction rich in butadiene and butylenes is recovered. This fraction is sent by pipeline to the Shell Chemical plant. Butane-butylene fraction from various cracking operations of a Shell Oil Company refinery is also sent to the butadiene plant. These two feed streams are treated in a manner described below to produce butadiene, isobutylene polymers and n-butane.

Butadiene from the Shell Chemical plant is pumped via pipeline to the polymerization (commonly called copolymer) plants operated by the Goodyear Synthetic Rubber Corporation and the United States Rubber Company. Here it is copolymerized with styrene from The Dow Chemical Company. At the Shell Oil refinery the isobutylene polymer from the butadiene plant is alkylated with isobutane to give a 95-100 octane number alkylate. Thus the operations of five separate organizations are completely integrated in this project.

As its part in Southern California synthetic rubber project the Chemical Company converts butadiene-butylene fraction received from Gas Company and butane-butylene fraction from Shell Oil's refinery into butadiene, isobutylene polymers and n-butane.

The material received at the Shell butadiene plant from the Southern California Gas Company comprises what is known as the "C_4 fraction" of the cracked stock, i.e., a narrow boiling range cut containing essentially only those hydrocarbons with four carbon atoms. The main constituents of this fraction are isobutylene, normal butylenes and butadiene. Normal butane and isobutane, ordinarily present in C_4 fractions, are not formed in the stove cracking process.

Early in March of last year, the research chemists at the laboratories of the Shell Development Company proposed a new method for removing small quantities of acetylenic material present in the cracked C_4 fraction from Southern California Gas Company. Design and process engineers drew up the specifications for the new unit, and orders for material were immediately placed. To-

Reliance Regulators

PLAY *vital* ROLE IN BUTADIENE PRODUCTION

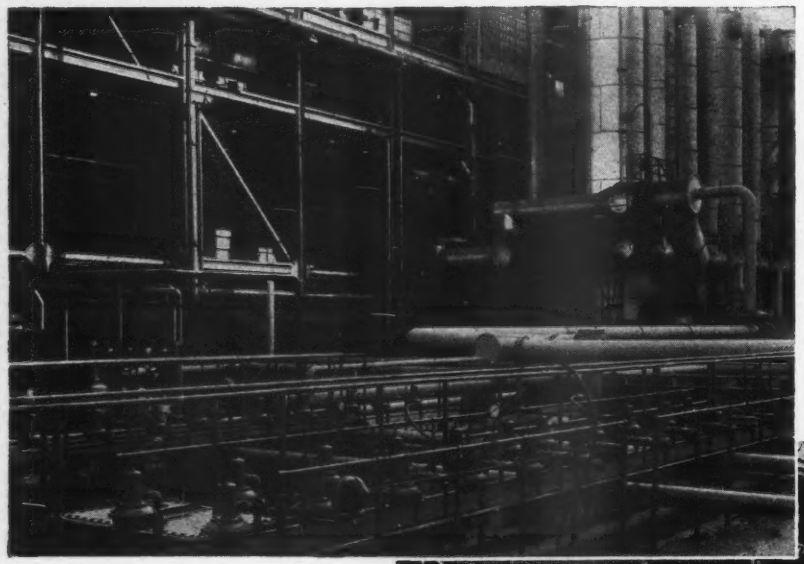
THE gas industry is playing a vitally important part in the production of desperately needed butadiene, used in the manufacture of synthetic rubber.

Reliance is proud that their regulators are contributing to the growing output. The photographs show a typical installation in a major gas company butadiene plant.

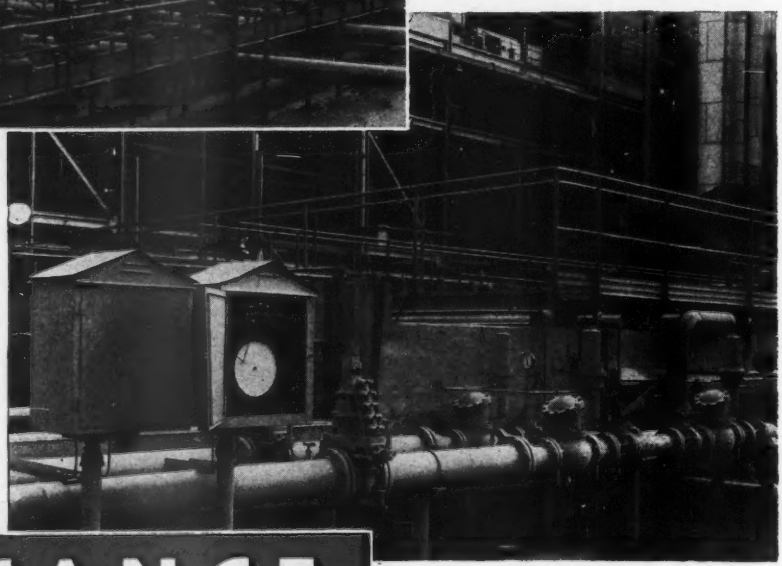
For over thirty-four years, Reliance engineers have worked with operating men in every field to perfect the flawless, trouble-free performance built into every Reliance Regulator —performance you can depend on regardless of requirements.

Reliance Regulators are made in types and sizes most needed by the gas industry—distribution, industrial, domestic—for natural, manufactured and liquid petroleum gas.

Current bulletins illustrate all late types of Reliance Regulators, complete with pertinent information.



Four batteries of twelve (each row) or a total of forty-eight 1½-inch Reliance HPH Regulators on flotation process.



American-Westcott Master Orifice Meters and three 8-inch Reliance, Model CBV-201, spring loaded regulators controlling high-pressure gases.

RELIANCE REGULATORS

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AMERICAN METERS

RELIANCE

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day, a few months after the conception of the idea, the new plant is in actual operation. This unit takes the caustic treated C_4 fraction from the Southern California Gas Company and removes the acetylenic material by a selective method. If these materials are not removed, difficulties will be encountered in the subsequent extraction step.

Acetylene-free material is combined with the product from the catalytic dehydrogenation area, described below, and is sent to the extraction unit. Here the butadiene is separated from the other constituents of the C_4 fraction by the aid of a selective solvent. The extraction process was developed by the Standard Oil Development Company. High purity butadiene is prepared by this process.

In addition to producing butadiene for synthetic rubber, this plant will furnish raw materials of importance to the aviation gasoline program. These are isobutylene polymer and a normal butane fraction. The normal butane is first isomerized to isobutane and then charged to the alkylation unit with the isobutylene polymer. The resulting alkylate has an octane number of 95-100.

What Happens to Raffinate

In the previous section on butadiene purification we have seen that the C_4 fraction to the extraction system splits into two streams. These are:

1) Purified butadiene.
2) Raffinate containing normal butylenes, isobutylene and butanes.

The raffinate stream is blended with a C_4 mixture from the Shell Oil Company's refinery. The Shell Oil C_4 mixture is obtained from cracking operations and contains the same components as the raffinate. This C_4 blend is subjected to a series of processes which split it into the following three fractions:

1) Isobutylene polymer.
2) Normal butylenes.
3) Butanes.

In order to effect the removal of isobutylene from the C_4 blend, the Shell Cold Acid Process is employed. By holding the temperature and acid concentration within the proper limits, isobutylene is selectively absorbed. The two streams leaving the extraction system are:

1) Fat Acid (containing absorbed isobutylene).
2) Hydrocarbon layer containing normal butylenes, butanes, and small amounts of C_4 polymers.

Isobutylene is sprung from the fat acid as polymer. The mixture of acid and hydrocarbon is then separated. The lean acid is returned to the extraction unit. The hydrocarbon is caustic washed to remove any acid carried over and then sent to Shell Oil Company.

The hydrocarbon layer from the acid extraction system is caustic washed to remove traces of acid and is then charged to a rerun tower for polymer removal. The overhead from the rerun column is a C_4 mixture containing normal butylenes and butanes.

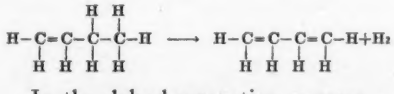
The isobutylene-free C_4 mixture from the Shell Cold Acid Process is split by means of the Shell Extractive Distillation Process into the two fractions, normal butylenes and butanes. In this step the C_4 fraction and a solvent are charged to an extractor tower. The overhead from this extractive distillation consists mainly of the butanes. The bottom product which is a mixture of normal butylenes and solvent is charged to a stripper column. Here the normal butylenes are separated from the solvent and taken off as overhead product. The solvent is taken off as bottom product and returned to the extractor tower. Facilities are also provided for concentration and purification of the solvent.

The Cat. Dehydro. Unit

The prime purpose of the above-described isobutylene and butanes removal process is the procurement of relatively pure normal butylene for feed to the catalytic dehydrogenation unit (henceforth called Cat. Dehydro. unit).

The Cat. Dehydro. unit processes normal butylenes to yield butadiene plus hydrogen. This process employs a special dehydrogenation catalyst, commonly called Jersey 1707.

The reaction of normal butylene to butadiene plus hydrogen is shown by the following equation:



In the dehydrogenation process a part of the normal butylene charged is converted to butadiene, part is decomposed to lighter products and coke, and the remainder is unreacted. The unreacted normal butylene is recovered from the product, combined with fresh feed, and returned to the unit. Due to the deposition of coke and tars on the catalyst surface, the catalyst loses activity as processing continues and a continually decreasing amount of butadiene appears in the product. When this falls to a low value, processing is discontinued and the catalyst is given a regeneration treatment which restores its activity. Thus, in order to maintain an uninterrupted flow of feed to, and product from, the Cat. Dehydro. unit, it is necessary to employ twin reactors operating out of phase.

The Cat. Dehydro. unit has been designed to produce approximately half of the total butadiene output. The production rate requires steam superheaters capable of delivering large quantities of steam at a high temperature. Because of the large volumes of normal butylenes, superheated steam and catalyst which must be handled, special consideration has been given to the problem of uniform mixing of the gases and uniform distribution of flow through the catalyst bed.

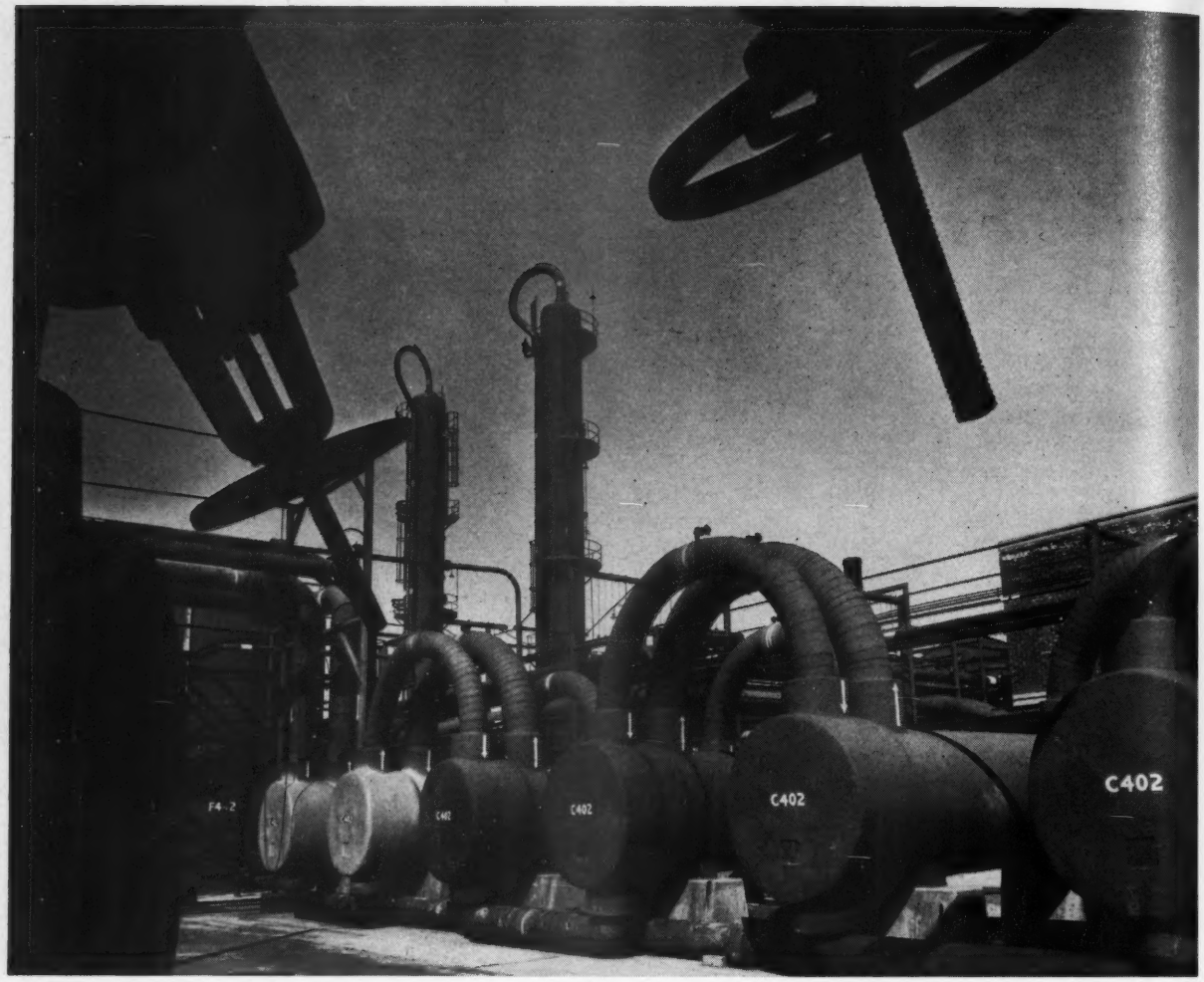
Gas Recovery System

From the preceding description of the Cat. Dehydro. process it is seen that the gas leaving the reactor contains several components. These consist of:

1) Butadiene.
2) Hydrogen.
3) Unreacted normal butylene.
4) Steam.
5) Decomposition products: CO_2 methane; ethane-ethylene, and propane-propylene.

From this gas which is at high temperature and approximately atmospheric pressure, the butadiene-normal butylene fraction must be separated. This step is accomplished in a gas recovery system, consisting of the following:

1) Cooling and separation of steam condensate.
2) Compression.
3) Oil scrubbing of the compressed gas to recover any C_4 components remaining in the gas.



Heat Exchange Equipment in the butadiene purification unit exchanges heat from one process stream to another to effect a saving of heat. Towers in the background purify butadiene.

4) Fractionation of the liquid from step 2) into C_3, a C_4, and a C_5+ heavier fraction.

The cooling of the hot gases to atmospheric temperature is accomplished in three successive steps. The hot gases are first sent to a waste heat boiler. Here the hot gases are heat exchanged against water and steam is generated. This steam is used in the Cat. Dehydro. superheaters. The hot gases from the waste heat boiler then go to a stripper-scrubber. Here the gases flow countercurrently to the rich scrubbing oil obtained in step 3) above. The stripper-scrubber serves a dual function in that it cools the gases and simultaneously strips the rich oil. The stripped oil is cooled and returned to the gas scrubbing tower. The hot gases from the stripper-scrubber are then heat exchanged against plant cooling water to give the final cooling to atmospheric temperature. In this cooling step, steam condenses and is removed from the system by means of a separating tank. Steam condensate is drawn off the bottom and the gas taken overhead.

The gases are compressed and cooled to remove the heat of compression. This step causes liquefaction of most of the C_3 and heavier components in the gas. The hydrocarbon liquid and gas phases are separated in a separating drum. The compressed gases from the separator are charged to the bottom of the absorption tower and scrubbed by countercurrent flow against the lean oil from the stripper scrubber. This removes the C_3 and heavier fractions from the gas. The rich oil leaving the bottom of the absorption tower is returned to the stripper-scrubber. The stripped gases leaving the top of the absorber tower are mainly hydrogen plus small amounts of C_1 and C_2 hydrocarbons. These are used as fuel gas.

The liquid phase obtained from the separator used after the compression step contains C_3, C_4, and C_5 hydrocarbons plus traces of polymer. This stream is charged to a depropanizer column where the C_3 components are removed as overhead product and sent to the plant fuel system. The C_4 and heavier fractions are taken off as bottom product from the depropanizer and charged to a debutanizer column. The C_4 components are taken off as overhead product and the C_5 and

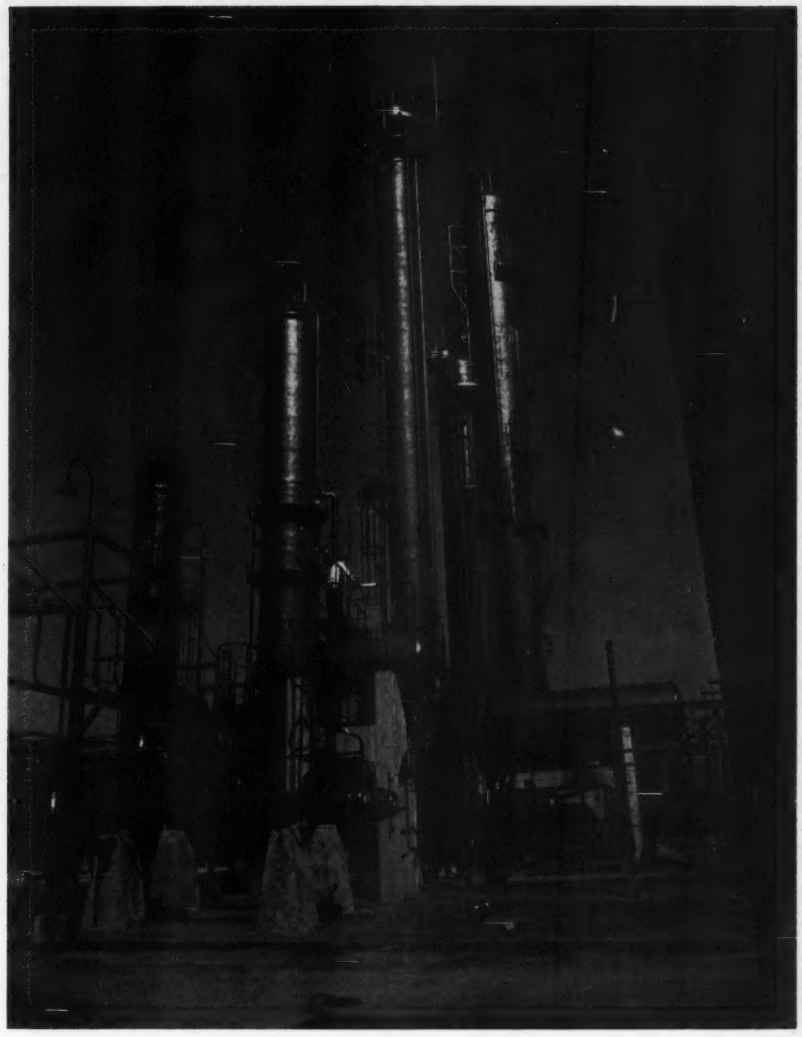
heavier fractions are removed as bottom product. The C_4 fraction is then charged to the extraction system for butadiene removal. The C_5 and heavier fractions are sent to storage. The complete integration of the several processes used at the butadiene plant is shown on the appended flow sheet (Page 9).

Continuous Operation

The butadiene plant, as is the case with almost all modern chemical plants, operates continuously. The feeds and products are all transported by pipeline to and from neighboring chemical companies which also operate continuously. Therefore, large storage facilities are required in order to provide uniform flows to all stages of the process. At the same time, storage capacity is a safety measure which will be useful under wartime conditions in that it will prevent a shutdown of the whole interlocking group by the impairment of the productive capacity of one small part. Since the plant operates almost entirely in the liquid phase, the hydrocarbons which are gaseous at atmospheric temperature and pressure must be stored under pressure. Storage facilities are provided for the products of the Cat. Dehydro process before compression, collecting facilities for various bleedoff streams which would otherwise be wasted to flares, and a safety measure since the storage vessels can hold large quantities of gases released in the event of breakdown of any of the equipment. These storage facilities are supplemented by tanks, small only in comparison to the spheres, for solvents, absorption oil, polymer and such corrosive chemicals as acids and alkalies.

Steam is produced by Yarrow boilers reclaimed from obsolete United States Naval Destroyers, waste heat boilers and specially designed superheaters. The boilers are gas fired but can be fired with fuel oil. A Kemp inert gas generator supplies inert gas used for purging and blanketing operations throughout the plant. The plant electric power requirement is supplied by a public utilities company.

Primary cooling is obtained with water. Economical natural draft towers, 15 feet wide by 1300 feet long, over which the water cascades down 40 feet, cool the water.

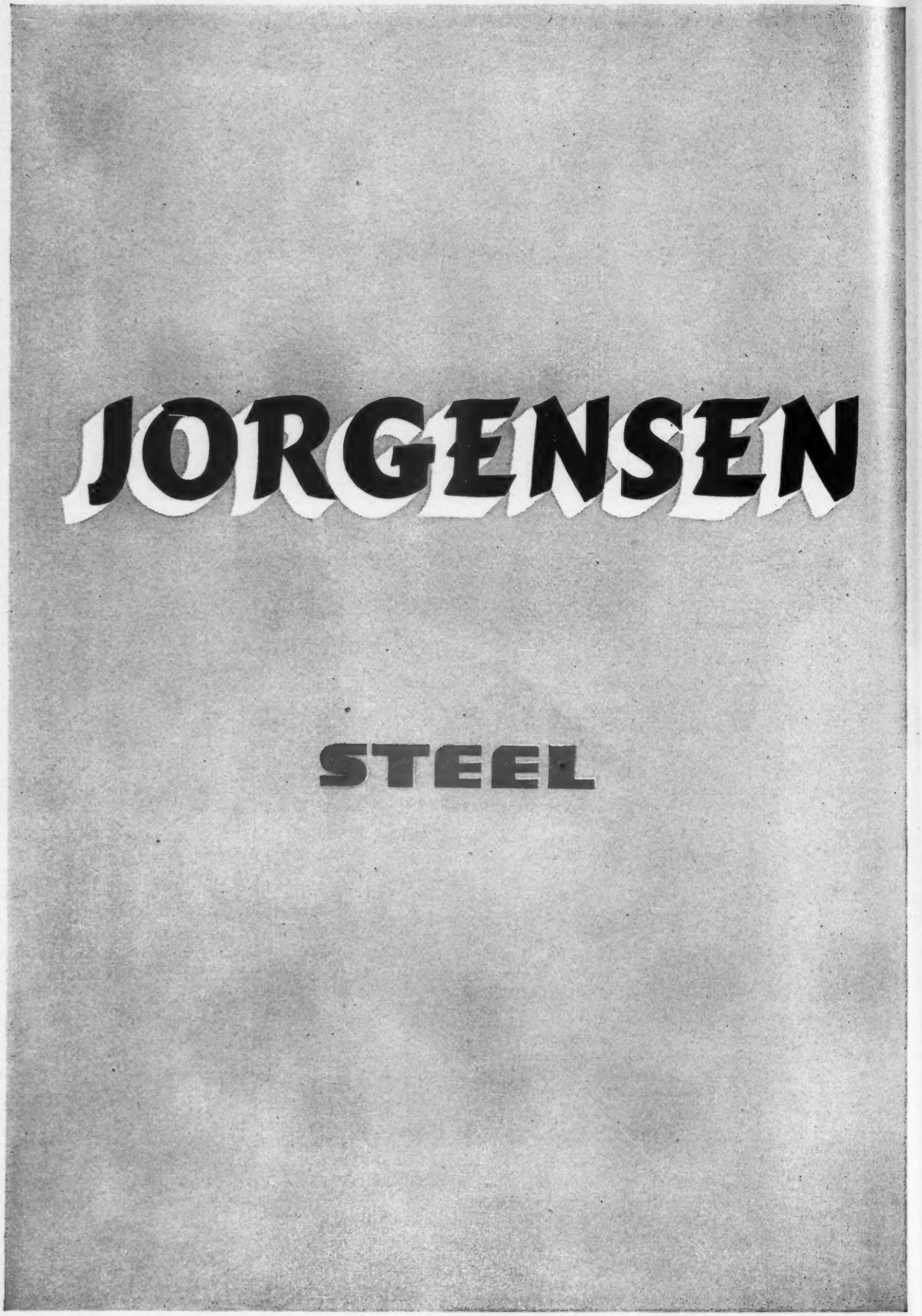


Acetone Extraction Unit separates butylenes from a mixture of hydrocarbons. The butylenes are later converted to butadiene.

The cooling water is distributed under ground through 24 and 36 inch lines made of steel-saving redwood staves. Cooling water, make-up and water for other process requirements is supplied by several public water companies. A large and complete water treating system is also in operation. The water is treated to prevent scale formation in boilers and exchangers, gaseous corrosion in the lines and equipment, and to kill algae and bacteria which would otherwise coat exchanger surfaces and decrease efficiency.

Subcooling is supplied by ammonia refrigeration employing Clark Brothers' compressors driven by fuel gas engines. A skimming basin and treating plant is also provided to remove objectionable materials from the plant effluent.

To obtain the highly skilled personnel necessary to operate the plant, the butadiene plant has drawn heavily from the personnel of the Shell Chemical, Shell Development and Shell Oil staffs. Thus, the experience gained in years of operation and development of all the varied but similar processes is being utilized at the Torrance plant. By means of an extensive training program this experience has been passed on to trainees selected from universities all over the country. Out of the total operating and office force over one-fourth are highly skilled supervisory, operating and technical personnel. As in most war plants, some women are being used.


JORGENSEN
STEEL

Timer Panel—Control Room, Standard of California's Butadiene Plant

Standard of California Also Produces Butadiene

As part of the Southern California synthetic rubber project initiated by the Federal Government, the Standard Oil Company of California designed and supervised the construction of a butadiene plant at its El Segundo refinery. The plant, financed and owned by the Defense Plant Corporation, is operated by Standard of California as agent, under contract with Rubber Reserve Company. Operation of the plant was initiated early this year and it is now producing butadiene.

The plant was designed and constructed within a period of about 12 months. Process and equipment designs were made essentially without the aid of semi-commercial or pilot scale experiments, because of the necessity of starting plant operations at the earliest possible date.

The plant design calls for the production of 15,000 tons per year of butadiene, which when combined with 5,000 tons of styrene, will yield 20,000 tons of Buna S rubber per year.

The butadiene is produced by catalytic dehydrogenation of normal butane, which is available at the refinery in essentially pure form.

Utilizes Houdry Process

The dehydrogenation process used was originated by the Houdry Process Corporation, and was developed by the joint efforts of Houdry, the Catalytic Development Corporation, the Sun Oil Company, and the Standard Oil Company of California. The El Segundo plant is one of two plants thus far built to utilize the Houdry butadiene process. Normal butane is dehydrogenated when it is passed through a bed of catalyst at high temperature. Part of the butane is dehydrogenated to butadiene, part to butene, and some is converted to coke and light gases during the first pass through the catalyst. The butadiene is recovered from the reaction products after removal of the light gases, and the remaining butane-butene mixture is routed back through the catalyst for further conversion. All the normal butane fed to the plant, therefore, is recovered as butadiene or appears as coke or as light gases which are used as fuel.

The coke produced by decomposition reactions is deposited on the catalyst and is burned off at regular intervals by admitting air to the catalyst chambers. The quantity of air used in this step is in considerable excess over that which is required for burning the coke, in order to provide means for correcting undesirable temperature changes in the catalyst. The alternate dehydrogenation and coke burning periods are automatically controlled by an electrical cycle timer because the frequency and complexity of the operations are such that manual control is not feasible. The air and

Furnaces at left, reactors at right. Standard of California's Butadiene Plant.

butane-butene streams are admitted to the catalyst chambers through electrically operated valves whose motions are controlled by the cycle timer. This instrument contains hundreds of electrical contacts and required many months to build.

Heat Balance

While dehydrogenation is taking place, heat is absorbed from the catalyst, and the temperature falls, and while the coke is burned, heat is liberated, causing the catalyst temperature to rise. A unique feature of the Houdry process is that operations are so conducted that the heat absorbed during dehydrogenation is made to balance the heat liberated during the coke burning period. In this way equipment required for adding or removing heat from the catalyst is largely avoided.

The hot combustion gases leaving the catalyst chambers are passed through a bank of ten waste heat boilers, where the heat is recovered by generating steam, which is used for operating the plant. The blowers used for forcing the air through the catalyst were purchased second-hand to avoid delay and the use of critical materials and fabrication facilities required in obtaining new equipment.

Butadiene is recovered from the products of dehydrogenation by solvent extraction, using a process de-

Interior of compressor house, showing batteries of Clark compressors.

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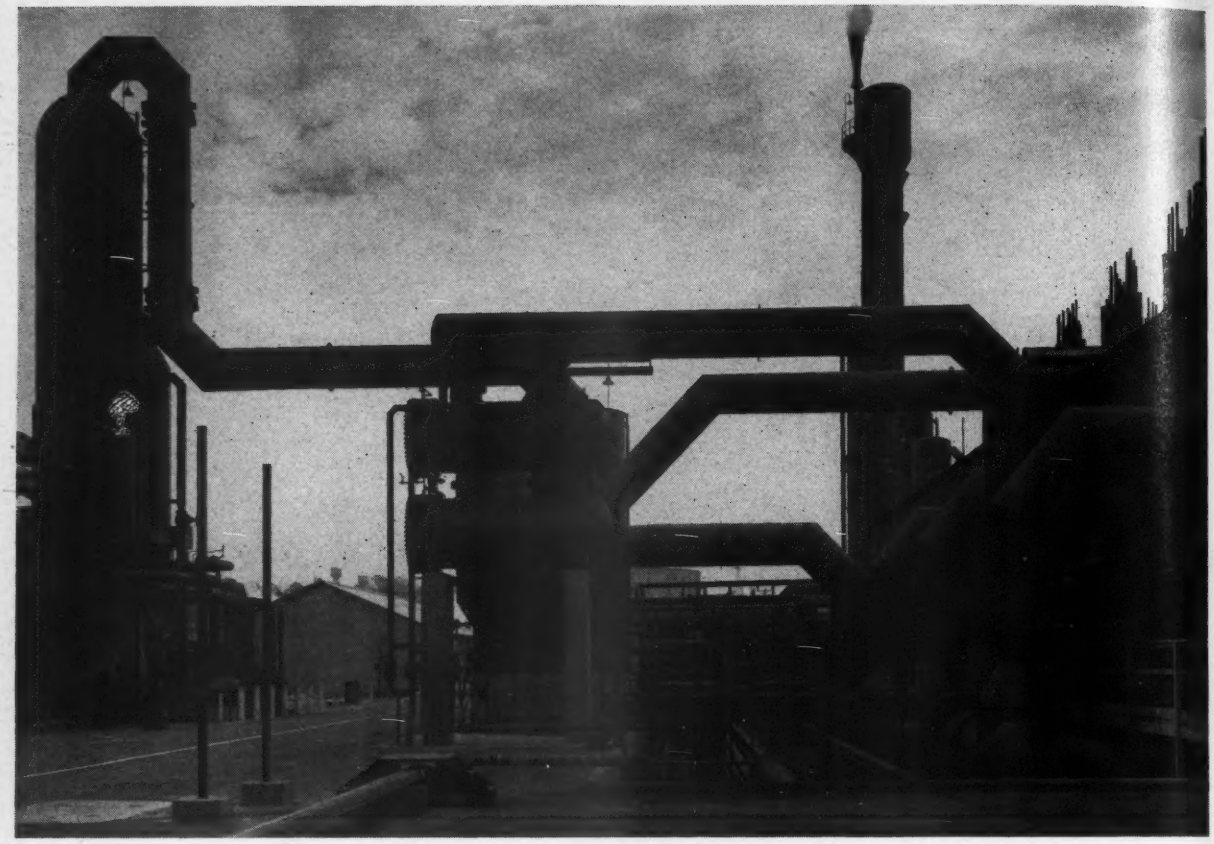


Exterior of Compressor House in foreground. Right to left: Butadiene Scrubber, Butane Scrubber, Desorber, Extraction Towers, Compressor Interstage Coolers, and Quench Column.

veloped by the Standard Oil Company of New Jersey, and released for use by operators in the synthetic rubber program.

Because of the ease with which butadiene combines with itself to form heavy liquids or solid materials, it is necessary to add small amounts of a chemical which inhibits its polymerization if the butadiene is to be stored for more than several days. The inhibitor is added to each tank of product as it is produced.

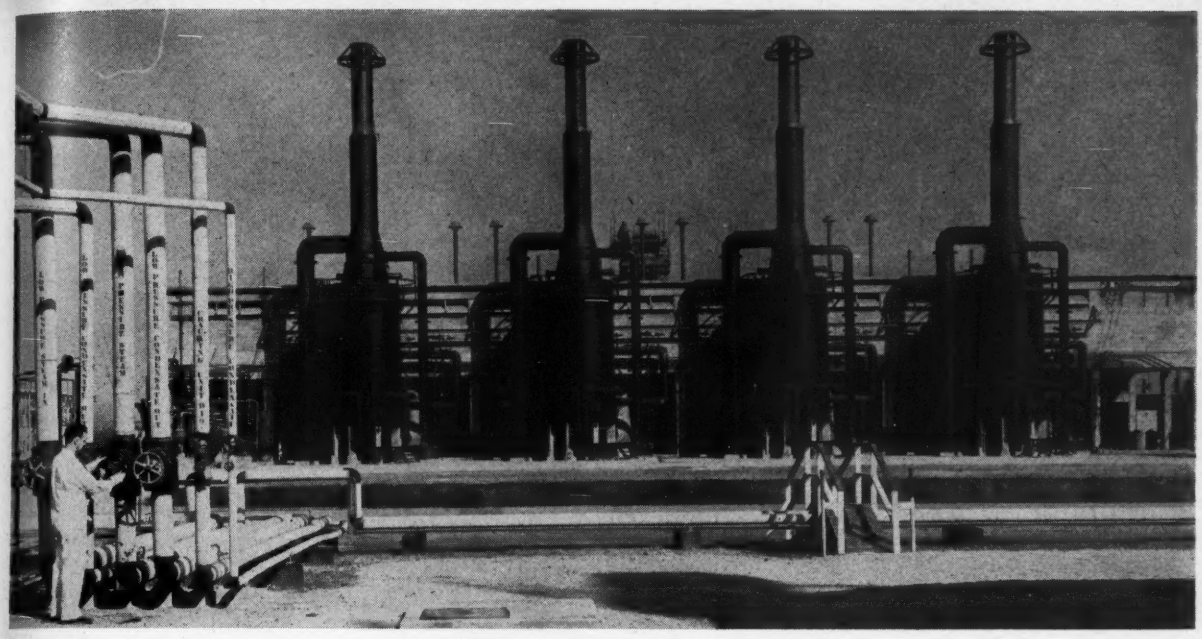
The finished product is shipped by tank truck to the U. S. Rubber Company and to the Goodyear Rubber Company at Los Angeles, where it is combined with styrene to make Buna S rubber.

How Styrene is Made at the Dow Plant

The Dow Chemical Company's styrene plant was the first of the California synthetic rubber units to go into production. Since the California synthetic rubber units could not at the time utilize this production, for many months most of Dow's styrene was shipped to other synthetic plants in the East.

The Dow plant is actually a mammoth series of pipes and tanks in which chemical reactions takes place, and is the climax of years of styrene experimentation and commercial production by that firm. From the time of its discovery nearly a century ago, scientists thought that styrene, if made in quantities, could be made inexpensively. But for 90 years, extensive manufacture of this material was prohibited by sky high cost. Then The Dow Chemical Company made a startling discovery and began producing less costly and higher quality styrene. This discovery resulted first in a pilot plant to produce small quantities of styrene under conditions similar to those to be encountered in a large scale plant, and later resulted in a large plant sufficient to manufacture styrene in quantities which before were considered impossible.

The styrene at the Dow plant is made in a group of small units, each an integral operating section designed to manufacture certain chemicals independently of the other units. From the wine industry of California, Dow receives 15,000 gallons of pure alcohol per day. This is used in the manufacture of ethylene, and this gas is piped to the ethyl benzene plant. In the ethyl benzene plant, 15,000 gallons of pure benzol are used daily. Much of this benzol comes from the Kaiser Fontana, California, coke ovens. Ethyl benzene is piped to a third plant, and the material is processed



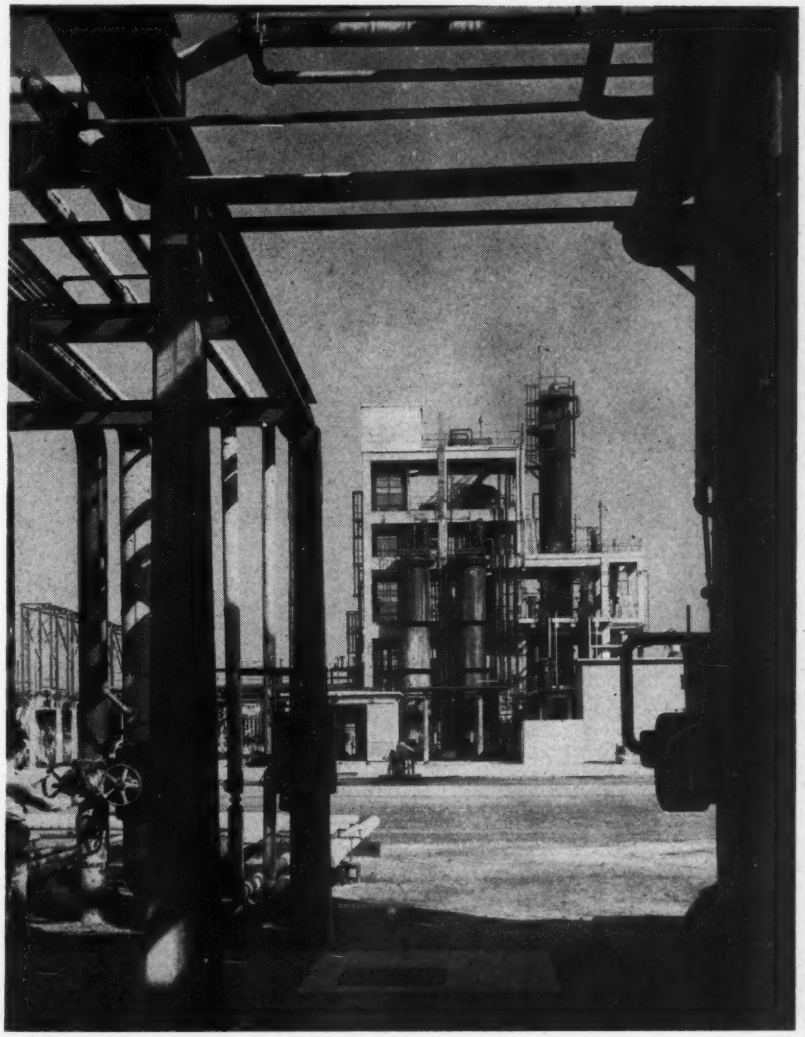
The Dow Ethyl Benzene Dehydrogenation Unit. Ethyl benzene is passed through these huge furnaces where part of it is decomposed into styrene at the Los Angeles plant. The part that is not decomposed is sent through the furnaces again.

in the presence of catalysts and crude styrene is produced. Thus, by joining two raw materials and passing them through 35 miles of pipe line, and through gas furnaces, crude styrene emerges.

The styrene is then passed to a fourth plant and is purified by distillation in a series of cylinders, and is finally precooled to prevent polymerization. The final product is more than 99 percent pure styrene. It is then piped to the co-polymer units operated by Goodyear and U. S. Rubber, to be combined with butadiene to form the Buna-S synthetic rubber.

Within the plant area is a steam plant which supplies heat and power to the entire styrene production area and to the rubber companies. A large modern chemical laboratory and instrument shop is maintained on the grounds to control production.

Only about 35 operators are needed on each of three shifts to control by delicate instruments the entire process. These men produce suffi-



The Dow Ethyl Benzene Unit. In this Los Angeles unit, ethyl benzene is made from benzol and ethylene. Later, ethyl benzene is piped to another Dow unit where it is converted into styrene.

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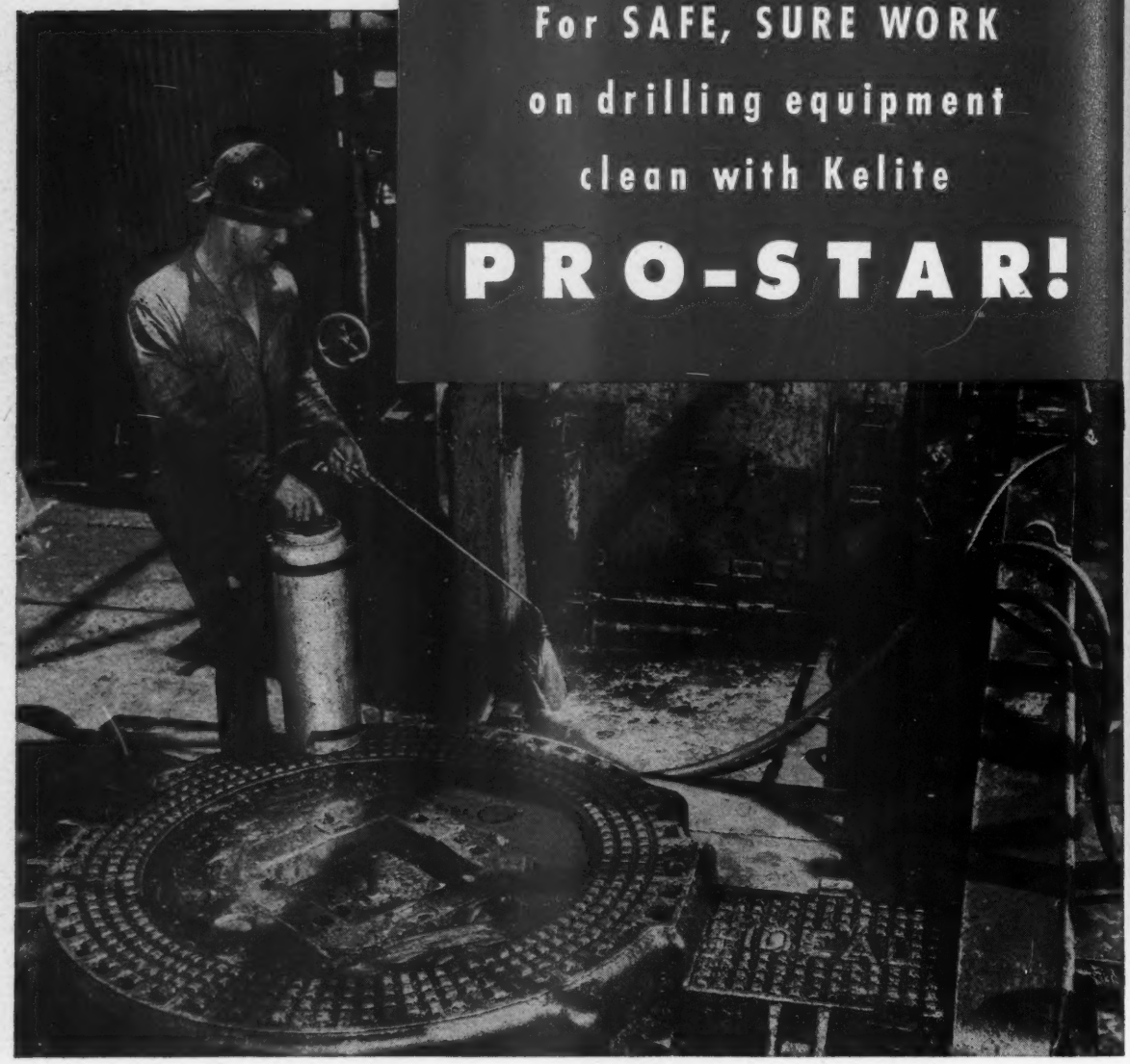

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Pro-Star, the new Kelite material developed at the request of drilling operators, expedites removal of the slippery, dried-on deposits which make equipment hazardous to work on. It penetrates crude oil, grease and sludge, loosens stubborn deposits so that they can be knocked off by steam or hot water under pressure.

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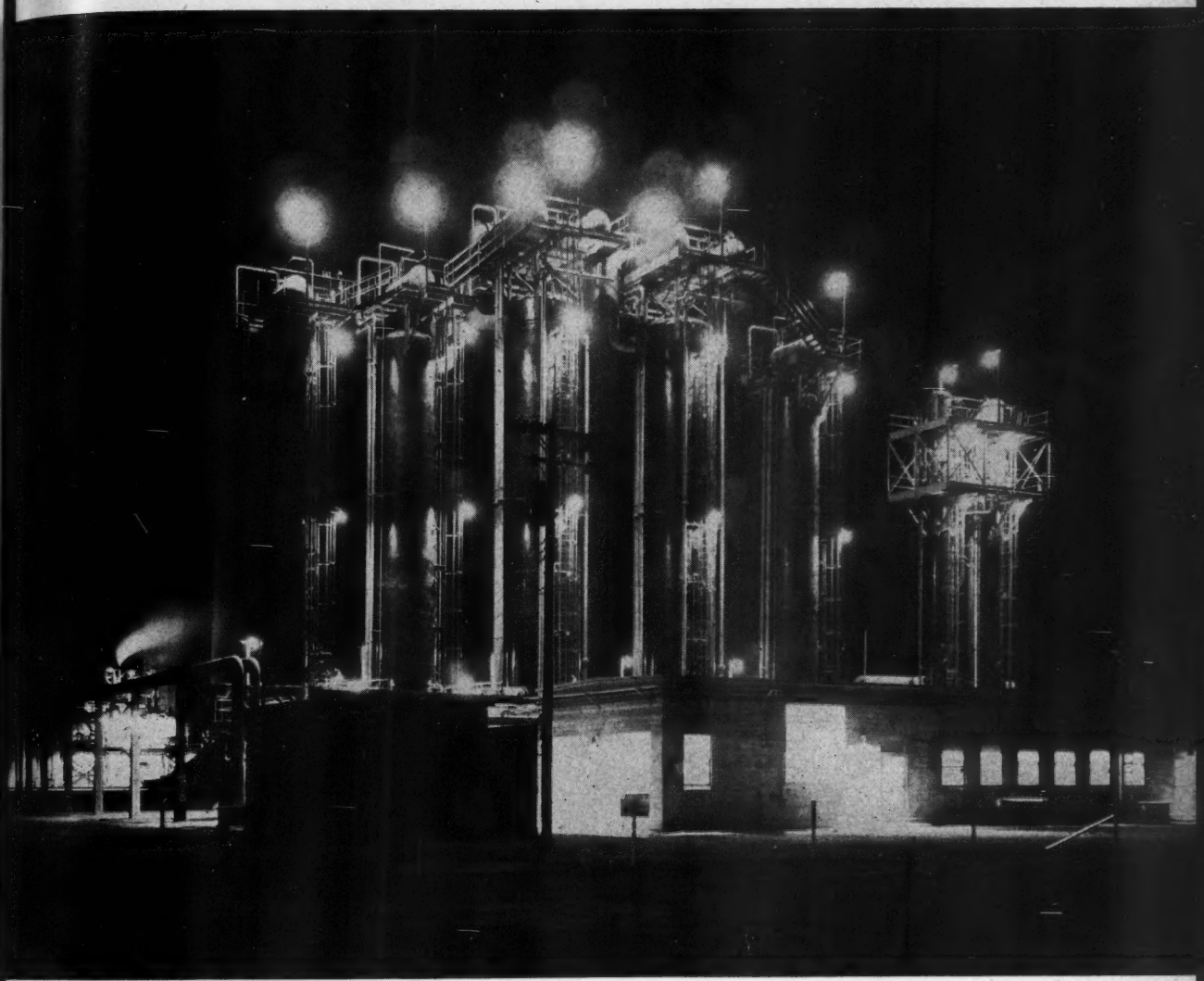


The Dow Styrene Finishing Unit. Stairs of progress and a promise of complete independence from natural rubber. This unit works through the night to produce styrene for the Southern California synthetic rubber industry.

cient styrene to make approximately 90,000 tons of synthetic rubber annually. This means that each operator will produce about 2,500 tons of synthetic rubber each year, as compared with one plantation worker required for every ton of natural rubber produced annually. Another way to look at it is that this styrene, when combined with butadiene, will manufacture as much rubber as that normally produced from 20,000,000 Hevea trees covering 250,000 acres. The styrene plant covers less than 100 acres of ground.

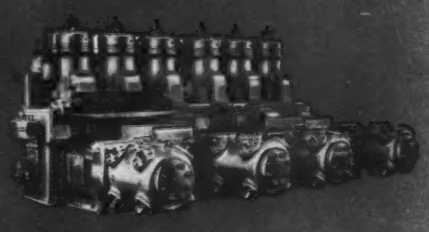
All of the styrene produced in this plant will go into synthetic rubber as long as the country is at war.

Dow has an interesting history. In 1889 the little town of Midland, Michigan, was enjoying a much needed rest, after the lumber boom had stripped the country of its big trees. Then Dr. Herbert H. Dow brought a big idea to the town—a new and cheap process to extract bromine from the brine that was so plentiful in central Michigan. The plan was successful, and The Dow Chemical Company was born. Later, this process was further adapted to the extraction of chlorine from brine, and a process to produce carbon tetrachloride, a wonderful non-inflammable cleaning fluid, was developed. In the meantime, insecticides and magnesium chloride, a building material, were produced. After the first world war, a new process was devised for the production of phenol, and soon a vast new array of phenol derivatives and by-products such as aspirin, artificial flavors, and perfumes were being manufactured in this country.

Of particular interest to the nation at the outbreak of World War II was Dow's knowledge of plastic and magnesium metals. Government contracts have resulted in increasing Dow's magnesium production so that now about 60 percent of the country's magnesium is produced by Dow. Although all of Dow's plastics are much in demand by the Armed Services, only styrene was demanded in quantities almost astronomical—for synthetic rubber. Today Dow is producing about half of the country's styrene.

CLARK "ENGINE
in California Buta

12 CLARK "Angles" totalling 7,500 BHP, Standard of California Butadiene plant



CLARK 6-cylinder, 750 BHP supercharged Gas-driven "Angle"

The Clark Angles in the huge California Rubber project are typical of what the Clark organization can and is willing to to do for special engineering problems in the handling of hydrocarbon gases.

The Clark Angles in the Standard of California Houdry plant were specially engineered and built for the unusual operating conditions in this plant. In spite of the pressure of large and urgent war contracts, Clark engineered and built special tandem double acting compressors needed for this application, in record time.

NEERED" ANGLES
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The Clark Angles for the Shell Oil Co.'s plants were also built in an unusually short time.

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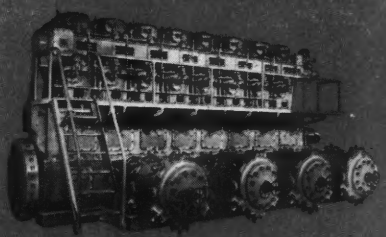
7 CLARK 1000 BHP Supercharged "Angles", in refrigeration service, Shell plant



CLARK 8-cylinder, 4,000 BHP steam-driven "Angle"

CLARK

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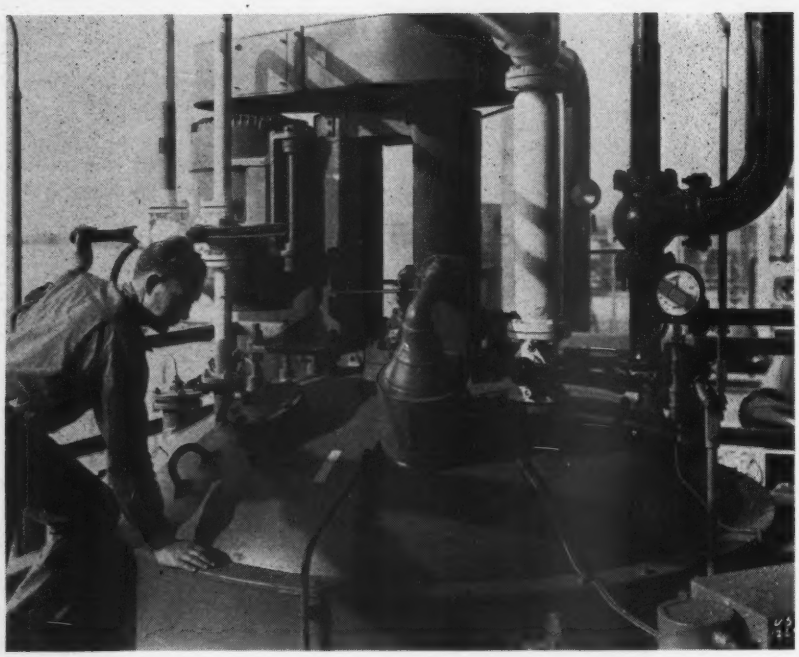
. . . SETS THE PACE IN COMPRESSOR PROGRESS

Goodyear and U. S. Rubber Complete the Process



View of the reactor tank in one of the three rubber making plants operated for the California Synthetic Project by the Goodyear Synthetic Corporation and the United States Rubber Company. Worker is shown inspecting batch for butadiene and styrene which polymerizes in these reactor tanks to form rubber latex.

Synthetic rubber latex comes from blending tank to coagulation unit where acidified latex forms into rubber crumbs. Worker is shown inspecting resultant crumbs at one of three co-polymer units operated for the California Synthetic Project by the Goodyear Synthetic Rubber Corporation and the United States Rubber Company at Los Angeles.

The three polymerization plants, with a rated capacity of 90,000 long tons of synthetic rubber annually, are operated by the Goodyear Synthetic Rubber Corporation and the United States Rubber Company.

The art of making rubber synthetically consists of choosing suitable raw materials, combining them in proper proportions, and causing the molecules to polymerize, or hook-up in the proper pattern with the aid of special chemicals, and by exact control of time, temperature, and pressure period. Buna-S uses butadiene and styrene as its basic raw materials.

The liquid styrene and gas butadiene in liquid form under pressure are received from adjacent raw material plants. For controlling the proportion of the basic raw materials and the assisting chemicals, in accordance with the precise chemical formula, there is a central control meter room in the reactor areas. The operator throws levers and the pre-determined amounts of the proper materials flow through a main pipe line into the reactors where polymerization takes place. The ingredients include butadiene, styrene, the soap solution, the catalysts, and other chemicals in solution and water.

The oily butadiene and styrene are emulsified in the soap solution by whipping them into small droplets.

The actual polymerization may now begin. The temperature of the batch is raised and controlled by water jackets from the reactor.

As the polymerization proceeds, the droplets become more viscous, and more rubber-like. Emulsion is now no longer one of an oil in liquid, but an emulsion or a soft solid in a liquid. This is now a synthetic rubber latex.

The progress of the reaction is carefully checked and when polymerization has reached the proper point, a chemical is added to arrest further polymerization. The batch is then run off to the blow-down tanks.

In the blow-down tanks the synthetic rubber latex is tested. The

The dried rubber is weighed on automatic scales which feed 75 pounds to the automatic balers where it is pressed into loaves 14 inches by 28 inches by 7 inches. The bales are shipped to the rubber manufacturers for processing into finished articles.

hydrocarbons which have not combined are then recovered. The volatile butadiene is separated from the mixture by letting it boil off as a gas, and it is recovered by compressing it again. The styrene must be recovered by distilling under reduced pressures at higher temperatures.

The batch of latex, containing 25% synthetic rubber, is treated with an anti-oxidant which prevents deterioration. Many batches of latex are bulked and blended for uniformity of product, in 30,000 gallon tile-lined, concrete, storage vats.

The synthetic rubber latex is then coagulated by salt and acid, and the small particles coalesce as larger flocs, or crumbs. In coagulation, 70 tons of rock salt, from California's desert areas is consumed daily.

After coagulation, the rubber crumb is filtered, washed and then pressed to remove the excess water, the rubber is dried by passing back and forth three times in large continuous driers. The 12 driers of the plants will evaporate 160 tons of water per day.

The dried rubber is then weighed on automatic scales, which feed 75 pounds to the automatic balers where it is pressed into loaves 14" x 28" x 7".

Bales of GR-S rubber are shipped to the rubber manufacturers for processing into finished articles on the same machinery as is employed for natural rubber.

Gas Company Unit

(Continued from Page 8)

gravity. Liquid products are skimmed off and pumped to the dehydration plant. Water, containing traces of liquid products not removed by the tar separator, enters the flotation cells wherein millions of minute bubbles, formed by forcing by-product residue gas through porous plates, attach themselves to particles of liquid products, float them away to pumps which deliver them to the dehydration plant. The clean water leaves the flotation cells and is pumped to the heat exchangers to be cooled. This entire system is enclosed to prevent escape of odors.

Waste-water is given a final clean-up in the filter plant prior to disposal.

Oil distillates from refineries are stored in the two tanks and 20,000 barrels per day are pumped from these tanks to the generators. The two tanks at the south end of the tank farm provide storage for aviation blend stock.

New horizontal tanks contain gasoline blend stock. Both of the blend stocks are recovered from the liquid products by processing in the dehydration plant. They are shipped via pipe line to Shell Oil Company where they are hydrogenated to high octane aviation gasoline or used for gasoline blending.

Clean water that never comes in contact with liquid products alternately removes heat from the hot water from the flotation cells by means of heat exchangers and gives up this heat by passing over the cooling towers.

The cooling towers provide cooling equivalent to more than 50,000 tons of refrigeration per day.

Emulsified water is removed from the liquid products in the dehydration plant.

Fuel oil from the dehydration plant is transferred to fuel oil storage tanks which existed in the present location. It is used interchangeably with by-products residue gas throughout the plant for firing boilers, the steam superheater, generators, and the alcorn furnace; any excess is sold.

There are 35 boilers operating in

(Continued on Page 40)

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A Bethlehem unit for every size of well

Use of Organic Colloid to Secure Minimum Water Loss Drilling Mud

It is now generally recognized that a properly controlled drilling fluid will overcome many drilling problems and that the low water loss of a mud is one of the most important properties in meeting various down-hole conditions. The use of colloidal clays and chemicals has been very effective in reducing water loss but has not been able to provide a mud with a water loss as low as necessary for many drilling operations. Considerable work on the development of extremely low-water-loss drilling muds has been carried on in the laboratory and in the field during the past several years and one result of this experimental and research work has been the perfection of a process using a specially prepared, organic colloid of the hydrophilic type known by the trade name of Impermex.[1] By properly preparing the mud and adding the necessary amount of this organic colloid, the water loss may be reduced below that obtainable by any other means and when sufficiently concentrated in the drilling fluid has reduced the water loss to less than 1 cc. A.P.I. Such a reduction may require as much as 20 or even 24 lb. per bbl. of mud but is particularly desirable when coring, when drilling low-pressure producing formations or when drilling through shale formations which disintegrate readily.

This additive is adaptable both to fresh water muds and to muds that are highly contaminated with salt water, acids, cement and other deleterious substances and will reduce the water loss of contaminated muds to the same minimum as that possible with normal muds. It thus offers a means of continued use of mud that would otherwise have to be discarded because of contamination. It has been used in both deep and shallow wells for (1) drilling through caving formations or those formations that ordinarily become dispersed in the mud stream when customary drilling muds are used; (2) for continued use of the same mud after penetrating a flow of salt water or otherwise contaminated water; (3) for drilling through productive zones with minimum loss of water into the formation; (4) for obtaining cores with least contamination by the fluid in the hole; (5) for making drill stem tests; (6) for utilizing sea water or other salt water sources for drilling fluid; and (7) for meeting routine drilling problems that require low-water-loss mud for their solution.

Impermex has proved its ability to reduce the water loss of a contaminated mud to a value below that of the original mud and its field of adaptability has recently been extended by the development of a special technique for its use. This technique provides for control of viscosity for any concentration of the material and prevents fermentation of the organic content of the admixture, thus permitting the use of the treated mud over any period of time desired.

The viscosity control is based upon the extraordinary behavior of muds containing Impermex when at a very high pH[2]. Under these conditions the Impermex appears to act as a protective colloid to a very high degree, decreasing the gels of the mud and bringing about a general reduction in consistency. The greatest reduction is obtained with these muds by raising the pH to a point somewhere between 11.8 and 12.5. Figure 1 is a curve showing viscosity versus pH for a mud treated with Impermex. Consideration must be taken of the fact that many clays have their viscosities raised in the presence of high pH. When such clays are encountered, means must be taken to offset this influence on viscosity in order to make the Impermex most effective.

Fortunately, the high pH range at which low viscosity is attained is the same range over which fermentation and bacterial action can best be controlled. By raising the pH of the mud to 12, or slightly above, before introducing the organic colloid, the full effect on reduction of water loss to the degree desired can thus be secured without impairing the other qualities of the mud fluid. Except under certain conditions as discussed later, chemicals must be added to the mud to prepare it for treatment and these chemicals are used in conjunction with Impermex to attain a high pH drilling fluid with a low water loss.

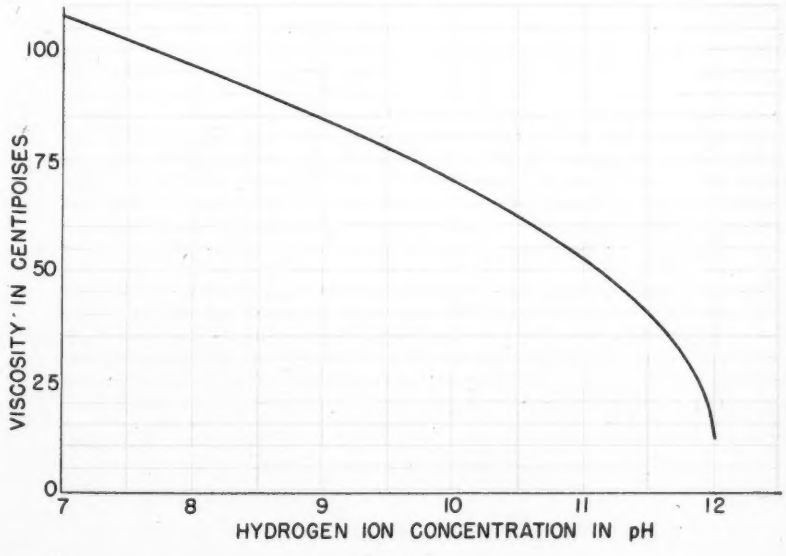

Figure 1
Viscosity versus pH for a mud with Impermex.

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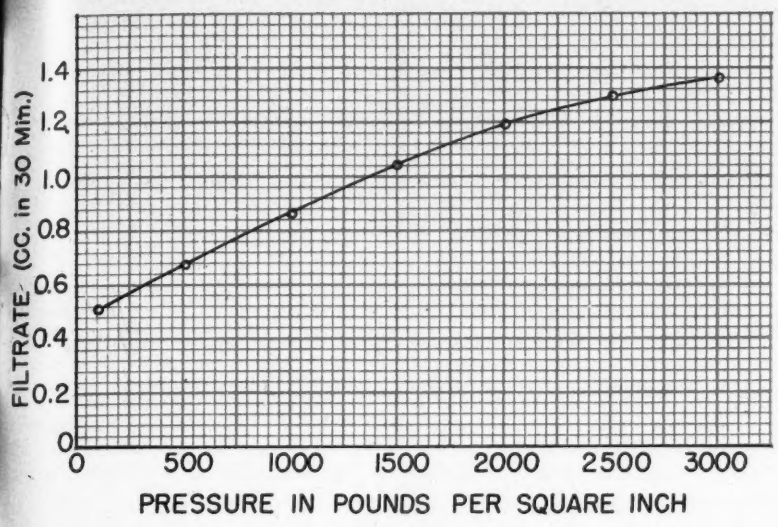


Figure 2

Effect of presure on filtration rate of a mud treated with Impermex. This mud retained its low filtrate value at greatly increased pressures.

The use of Impermex is not confined to treating muds contaminated with salts or other deleterious substances. By means of pH control, special purpose muds with an extremely low water loss can be prepared for coring operations, well completions and various other drilling operations. By using this organic colloid it is now possible to prepare a mud with an A.P.I. standard 30-minute water loss of less than 1 cc., a value unobtainable by means of clays and chemical thinners alone. An additional advantage over clays, and in particular for extremely low-filtrate muds, is its ability to maintain a low filtrate value at high temperatures such as those encountered at the bottom of a well.

Tests have been made to determine the increase in filtration rate with increased pressure. Figure 2 shows the results of a test made on an actual field mud treated with Impermex. Filtration tests were made at increments of 500 p.s.i. up to 3000 p.s.i. The slope of the curve indicates the ability of the mud to retain a low filtrate value at greatly increased pressures.

In Figure 3 are shown the water loss, viscosity, initial gels and 10-minute gels for various amounts of Impermex added to a red bed mud. The pH of the mud was raised to 12.5 with a chemical before the addition of Impermex without greatly changing the viscosity or other physical properties.

A study of the curves of Figure 3 shows the mud to have many desirable properties. The initial gel remains at a low value for all values of water loss. This is a property constantly striven for in clay base muds since, with a low initial gel, a mud will clean up and release entrained gas very readily. The 10-minute gel at no point reaches a value to cause difficulty in re-establishing circulation. Viscosity does not limit the minimum water loss that can be obtained. As shown by the graphs, a mud with a water loss of as little as 1 cc., A.P.I. or less is still fluid and workable. This can be understood better by noting the low gels associated with the high viscosity of such a mud.

A mud of this character approaches the truly viscous condition, as contrasted with the plasticity of ordinary clay-base muds. It is the type of viscosity which is associated with lubricating oils, glycerin, or sugar solutions. This kind of mud with a Stormer viscosity as high as 80 or 100 centipoises will pump and flow with the ease of an untreated clay-base mud having a viscosity scarcely greater than that of water (1 centipoise). This is in contrast to a straight clay-base mud which is unpumpable at even 60 centipoises. A mud thus treated will form homogeneous fluid, free of gas, and will maintain excellent lubricating properties. Viscosity and gel strengths can be controlled and weight can be carried at any desired point.

One of the greatest advantages accruing from the use of low-water Impermex muds arises from the combination of thin cake and extremely low water loss. While much has been written about the importance of low water loss in connection with muds generally, the full implications of such a combination of a thin cake and a low water loss are

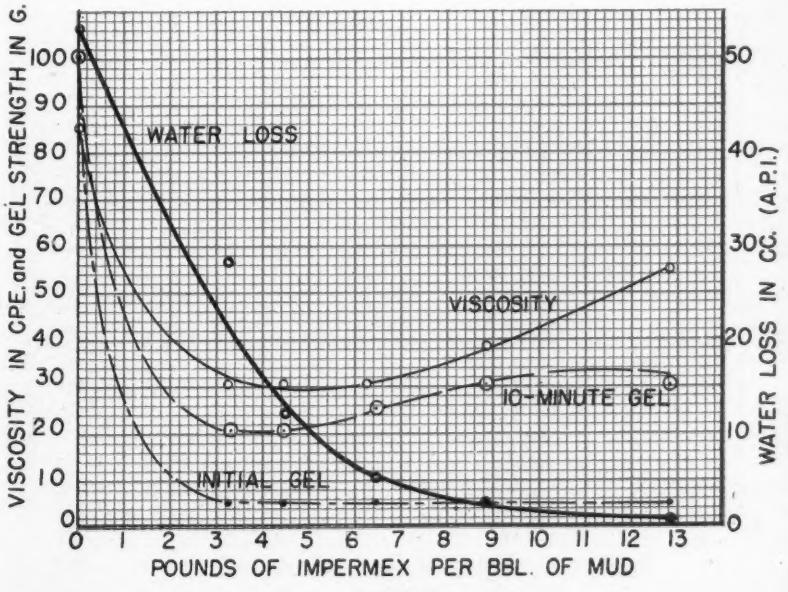
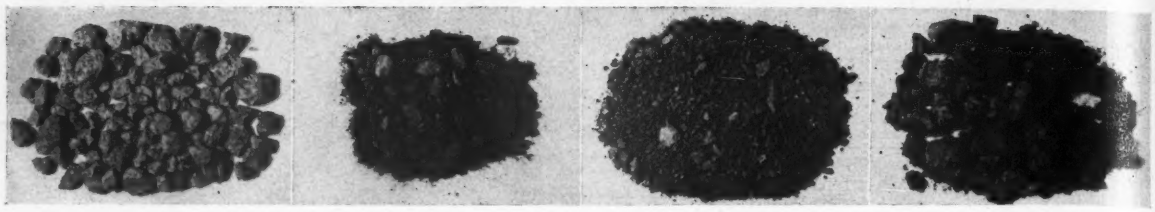


Figure 3

The water loss, viscosity, initial gels and 10-minute gels for various amounts of Impermex added to a red bed mud.

Figure 4



A
The original condition of the shale is shown before immersion in the drilling fluid. This same kind and quantity of shale was used in all tests here pictured.

B
The shale is shown after being shaken in contact with a typical fresh-water mud. Much of the shale has passed through the screen and has been dispersed in the mud fluid.

C
The shale has been shaken in contact with the same mud used in "B" after it was contaminated with salt. The shale has here broken up quite completely.

D
The shale has been shaken in contact with a high pH Impermex mud made from the salt-contaminated mud used for "C". The freedom from disintegration is apparent.

not always realized. From time to time in the ordinary well drilling operation the mud cake is effectively scraped down for the entire length of the open hole when the drill pipe and bit are withdrawn from the hole, and given a secondary scraping when the bit is again lowered. After a period of drilling, when an attempt is made to withdraw the tools again, the greatest single factor aside from caving formations, boulders, and the like, governing the success of the withdrawal is the extent to which the cake has undergone further growth after having been scraped down. This is primarily dependent upon the permeability of the cake, which in turn is reflected not by the water loss alone, but by both water loss and cake thickness simultaneously. Thus, a cake that is relatively thick, as shown in the standard 30-minute test, will have a proportionately higher permeability than a thin cake for the same test, even though the water losses of the two muds are the same. The quantitative relationships are too involved to be set forth in detail here, but it can be said that with a mud having the thin cake and low-water-loss characteristics of a concentrated Impermex mud, the additional cake build-up between bit withdrawals in the ordinary case is scarcely measurable.

Another property observed when using a low-water-loss, Impermex-laden mud was the ability of the mud to keep shale cuttings from hydrating and disintegrating, with the result that it was possible to drill through even quite plastic shale and still have all of the cuttings thrown out by the shaker and in substantially their original size, instead of having them disperse to make unwanted mud. Laboratory experiments have checked the field observations of this property. Figure 4 shows photographs of lumps of shale after having been shaken for a standard period of time with three different muds, all containing the same type of clay. The lumps of shale were then screened out of the mud and photographed.

General Methods for Use of Impermex

An Impermex-laden drilling mud is by its very nature a special type of drilling fluid, and this fact must be recognized and proper allowances made from the outset in connection with any given field job in which the use of this admixture is contemplated. Generally speaking, the more highly reactive an agent of any kind is, the more care must be taken in its use; and Impermex is not an exception to this general rule. Whenever it is used, proper provision must be made first to make certain that there is no possibility of decomposition, as from fermentation, various types of bacterial degradation, etc.; and second, the base mud to which the organic colloid is to be added must be in suitable condition or must be capable of being adequately modified so that the increase in viscosity generally brought about by its addition, particularly in large concentrations, does not become excessive.

Frequently it is possible to add Impermex to a drilling mud without any precautions being taken against decomposition, and the material stays good for prolonged periods. This may happen if the mud contains a relatively large salt concentration; or in other areas it may occur even in fresh-water muds possibly due to a freedom from inoculation with destructive organisms because of their fortuitous absence from the water and clay used and the formations penetrated. However, such occurrences are exceptional and in no case does it appear to be possible to count upon sterile conditions automatically obtaining without further care.

There are in general three methods available for inhibiting the decomposition of Impermex-laden muds. These are (1) the use of chemical bactericides, fungicides and anti-fermentatives; (2) the use of salt at concentrations not less than 20 per cent by weight of the fluid phase of the mud; and (3) the maintenance of the mud at a pH of about 12.

At the present writing, no chemical bactericide is known which affords absolute and enduring protection against decomposition. While many agents are known which have very considerable inhibiting effects, the protection is not reliable. Research on this problem is, of course, in progress and it is likely that in the near future an ideal chemical preservative will have been found, thoroughly tested, and made commercially available.

The use of salt in muds at concentrations near saturation is a convenient and sufficiently reliable method for use in areas where salt is naturally encountered during drilling. Where this method of preservation is used it is imperative that the salt concentration be kept at 20 per cent[3] or higher, as determined by titration of the filtrate. If the salt concentration falls below 20 per cent it becomes necessary to add salt to the mud. Where the

amount of salt naturally present in a mud is quite low, so that large amounts of salt must be purchased, it is usually not only more economical but also more satisfactory as far as results are concerned to use instead the third method of preservation, that of maintaining a high pH.

The high pH method of preservation consists of raising the mud to and continuously maintaining it at a pH of approximately 12. This is done in all cases by the addition of one or more alkalizing agents. The amount of alkali necessary varies widely, depending upon the original pH of the mud, the total base exchange capacity of the clay minerals therein, the presence or absence of cement, and similar variables. However, it may be said that in general the amounts of alkali necessary vary from about ½ to 3 or 4 pounds per barrel of drilling mud. The exact amount needed can be determined fairly accurately in advance by a pilot test on the mud sample. The alkali is added to the mud in the fashion usual with other chemical treating agents. After the alkali has been added, Impermex is introduced in the amount predetermined by pilot test.

The mud should be checked several times each tour for the first day or two after an Impermex treatment is begun, and at least daily thereafter as long as the mud is in use. Precautions must be exercised in the maintenance of a high pH Impermex mud to insure that all parts of the mud system are always kept at a pH of about twelve.

It is a general rule of good drilling mud treating practice that no chemicals or other materials should be added blindly without either a basis of past experience or pilot tests to indicate the probable result. This is particularly true in the case of Impermex muds because of the special nature of such mud and particularly in view of the high pH, under which environment common mud additives do not always behave in a normal fashion. By the same token, however, **unavoidable contaminations which are generally to be feared in ordinary muds are usually tolerated by high pH Impermex muds with absolute immunity.** For example, a high pH Impermex mud, made up in fresh water, generally can be contaminated with salt or salt water, or even large amounts of cement, and no harm or significant change in the characteristics of the mud will result. One should not prepare to discard a high pH Impermex mud after completion of drilling out a long cement column because more than likely the mud will be in as good shape afterwards as it was before. Ordinarily, after a high pH low-water loss mud of the proper viscosity is once prepared, regardless of conditions encountered in drilling, it is only necessary to make slight daily additions of Impermex and alkali—no other chemicals or viscosity reducing treatments being needed. This is one of the most desirable characteristics of such a mud, as it greatly simplifies the mud control. It is only necessary to check the pH and add enough alkali to keep it at 12 and check the water loss and add enough Impermex to maintain water loss at the desired figure.

[1] Impermex is a proprietary product distributed by Baroid Sales Division.

[2] The term pH denotes the degree of alkalinity or acidity possessed by a substance. The scale extends from slightly below 1 to slightly above 14, the neutral point being the middle or 7. Thus a pH above 7 would be on the alkaline side and a pH below 7 would be on the acid side. The basis of pH determinations is the hydrogen-ion concentration, pH being the logarithm of the reciprocal of the hydrogen-ion concentration in mols per liter. See "Drilling Mud Syllabus," *Drilling Mud*, May, 1941, page 5.

[3] 20 grams per 100 cc. filtrate; 200,000 p. p. m.; 12,000 grains per gallon.

California Hits New High In 1943 Drilling

A new high drilling record of 1,429 wells was reached in California in 1943. One hundred eighty-five wildcat wells were drilled, resulting in 21 new field discoveries. Eighty-six other exploratory wells resulted in 27 new pools and extensions. A disproportionately small reserve was added.

Drilling of development wells increased more than 100 percent over 1942, resulting in a new high record of 1,163 oil wells put on production. The total production of 283,662,445 barrels of oil gave a daily average of 777,166 barrels, a war production increase of 24 percent over 1942. Exploration activity and wildcat drilling showed a marked upturn.

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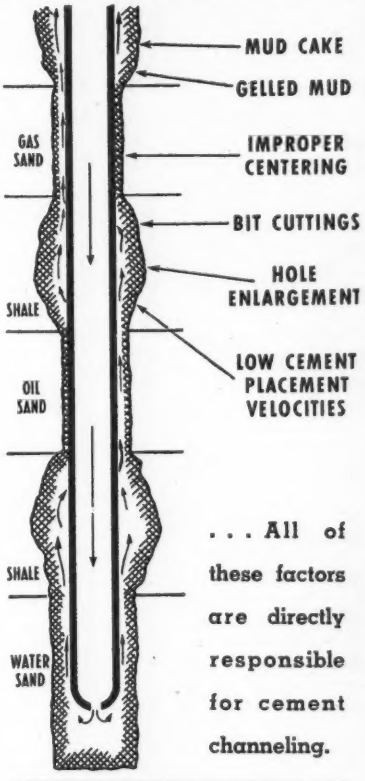

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ANNUAL DIRECTORS' LUNCHEON, CALIFORNIA NATURAL GASOLINE ASSOCIATION, BILTMORE HOTEL, LOS ANGELES, JULY 11, 1944

Outside, around table, left to right: H. R. Linhoff, Richfield Oil Corp.; J. S. Fluor, Jr., The Fluor Corp. Ltd.; W. A. Kirk, California Southern Oil Co.; Geo. C. McLaren, Standard Oil Co. of Calif.; P. S. Magruder, General Petroleum Corp. of Calif.; W. W. Robinson, Jr., The Texas Company; D. M. Wolfe, Standard Oil Co. of Calif.; George L. Tyler, California Natural Gasoline Assn.; C. D. Gard, Union Oil Co. of Calif.; R. D. Heath, Signal Oil & Gas Co.; M. L. Arnold, Richfield Oil Corp.; H. A. Dresser, The Flour Corp. Ltd.; R. D. Gibbs, Union Oil Co. of Calif.; E. W. McAllister, Western Gulf Oil Co.; J. C. Herron, Shell Oil Co., Inc.; Coles Bason, Ingersoll-Rand Co. Around inside of table, left to right: A. H. Bell, Continental Oil Co.; A. K. Hegeman, Clark Bros. Co.; H. E. Moulton, C. C. M. O. Co.; R. R. Crippen, The Texas Co.; Warren Kraft, Honolulu Oil Corp.; R. W. Garman, Pet. Administration for War; W. L. Rifenberick, Industrial Engineers, Inc.; H. A. Saueressig, So. California Gas Co.; W. C. Dayhuff, Standard Oil Co. of Calif.; J. B. Taylor, Signal Oil & Gas Co.

The Annual Meeting of the Board of Directors of California Natural Gasoline Association was held July 11, 1944, at the Biltmore Hotel, Los Angeles. This was the occasion for the formal transfer of leadership of the Association to C. D. Gard, Union Oil Company of California by R. W. Heath, Signal Oil and Gas Company, retiring president.

Mr. Gard joined C.N.G A. within two months of its organization in June, 1926, and has been active in its work since that time. He graduated in electrical engineering at University of Southern California in 1917 and saw service in U. S. Naval Aviation during the last war. After working for a time with the Los Angeles Bureau of Power and Light he entered the employ of the Union Oil Company of California in January, 1921, engaging in experimental work and the development of several ideas which were later incorporated in commercial plants. He has since served his company in the capacity of plant engineer, supervising the construction and operation of natural gasoline absorption plants; superintendent of gas operations, and since March, 1941, has been chief process engineer, field department, with headquarters at Santa Fe Springs.

C. D. GARD
President, California Natural Gasoline Association

Always willing to give generously of his time in C.N.G.A. activities, Mr. Gard has served as its technical committee chairman, a director and member of the executive committee, and as vice-president, with his election to the presidency for the fiscal year 1944-45. He has also been active in several A.P.I. committees from time to time.

Election of M. L. Arnold, Richfield Oil Corporation, as Vice-President was also announced at the meeting.

White Truck Expands Coast Facilities

Wilson D. Patterson, Pacific Coast Regional Manager, The White Motor Co., reports the addition of enlarged facilities throughout the West Coast in order to keep abreast of White's New Personalized Service program. Landner & Wood, White Distributor, Salt Lake City, will soon move into a new and larger building. In Long Beach, Frank Sawyer Motor Sales have purchased a large service plant and five adjoining lots. Gunderson Bros., of Eugene, Oregon, are constructing new and larger quarters. Another White Truck distributor, Routzahn White Truck Sales, of Oakland, California, is preparing plans for a new and large building. At Fresno, the Fresno Trailer Company plan to enlarge their facilities and, in Phoenix, Arizona, The Truck Equipment Company has just made plans to enlarge their facilities and, in considered one of the model truck service and parts depots in the Southwest.

Patterson pointed out that all this expansion is a forerunner of the White Truck program which calls for a post-war increase of White's direct outlets from about 200 to a total of 600 to maintain high employment after the war. The first phase of this job, helping the present distributor organization make their service stations more efficient, has been largely completed. Contacts have also been made toward increased outlets on the Pacific Coast as soon as the war ends. The White Company, nationally, now has about 150 distributor stations and, in addition, is maintaining 43 stations of its own which are giving day and night truck service.

Conservation Committee Holds Election

The Conservation Committee of California Oil Producers held the annual election of its two standing subcommittees in its meeting of June 28, 1944.

The new Administrative Committee consists of Henry F. Power, General Petroleum Corporation, Chairman; E. Robert Burns, MacDonald and Burns; D. W. Elliott, Operator; Russell H. Green, Signal Oil and Gas Company; and R. P. Huggins, Western Gulf Oil Company.

The new Allocation Committee consists of R. I. Brown, Standard Oil Company, Chairman; Warren Craddock, Pacific Western Oil Corporation; John Hancock, the Hancock Oil Company of California; W. L. Jarvis, The Texas Company; Joseph Jensen, Tide Water Associated Oil Company; R. C. Patterson, Belridge Oil Company; and John L. Stephens, Chanslor-Canfield Midway Oil Company.

Southern California Meter Association Annual Incoming and Outgoing Board Dinner. Held at the Riviera Restaurant, June 28th, 1944. Newly elected Officers for the year are: Mack McIlvaine, CCMO President; C. L. Hutchins, Tide Water Associated, Vice President; Lee Cheever, So. Counties Gas Co., Treasurer; Geo. H. Forster, Jr., The Texas Co., Secretary.
Seated Left to Right: Mrs. A. E. Holmlund, Edgar Valby, J. T. Cortelyou, Outgoing President, Mrs. J. T. Cortelyou, Lee Cheever, Miss Dorothy Eckhard, W. L. Cowan, R. N. Christiansen, Mrs. R. N. Christiansen, Geo. H. Forster, Jr., Mrs. Geo. H. Forster, Jr., Gordon Greene, Mrs. Gordon Greene, A. E. Holmlund.
Standing Left to Right: Mrs. F. J. Renner, Mark McIlvaine, Incoming President, Miss Vera Brown, Mrs. C. G. Cortelyou, C. G. Cortelyou, F. J. Renner.

Lane-Wells Co. Announce Executive Changes

Continued growth and diversification of the business of Lane-Wells Company has necessitated a number of changes in the company's executive staff, according to W. T. Wells, chairman, and Rodney S. Durkee, president.

M. E. Montrose

M. E. Montrose has been made vice-president and manager of services and sales. He will direct the activities of the oil field divisions, and head office, export, and industrial sales. Montrose entered Lane-Wells employ in 1935 and, after serving as manager of both the Mid-Continent and Gulf Coast Divisions of the company, was made vice-president and general sales manager in 1939.

Norman L. Dorn, vice-president and chief engineer, will continue to head the engineering department and will be responsible for the design and development of all equipment and products.

Dr. Russell M. Otis has been advanced to the position of manager of research and will manage the activities of the research department under the direction of Mr. Wells. Dr. Otis will also handle all patent matters.

Harvey L. Ballough, for many years associated with Douglas Aircraft Company and, lately, with Goodyear Aircraft Corporation, has joined Lane-Wells as executive assistant to the president. In addition to assisting the president in the coordination of the operations of all departments, Ballough will direct the activities of the newly established industrial relations department.

Captain D. S. Jeppson has been released from service in the U. S. Marine Corps and has rejoined the company in his former capacity of director and controller.

Lewis Appointed Sales Manager of L. A. Steel Casting

The Los Angeles Steel Casting Company announces the appointment of Mr. Ralph A. Lewis as Sales Manager for the Company.

Mr. Lewis has a background of some twenty years experience in the foundry industry of Southern California and has been a member of the Los Angeles Steel Casting Company staff for the past twelve years.

During this time he has served as a sales engineer, specializing in the application of steel castings to the petroleum industry and is well versed in the requirements of the drilling, production and refining divisions of the industry.

The Los Angeles Steel Casting Company has an outstanding production record, having been awarded the Maritime "M" Pennant for its contribution to the shipbuilding program.

Production methods and metallurgical practices developed under war time conditions will be adapted to the peace time requirements of Southern California Industry.

Ralph A. Lewis

Fuller Succeeds Stewart at Bethlehem

H. H. Fuller has been elected vice president in charge of West Coast steel activities of Bethlehem Steel Company, effective July 1, as announced recently by E. G. Grace, president of the company.

H. H. Fuller

Mr. Fuller succeeds W. H. Stewart who has held the office for the past twelve years. Mr. Stewart, though retiring from active duty, will continue in an advisory and consulting capacity.

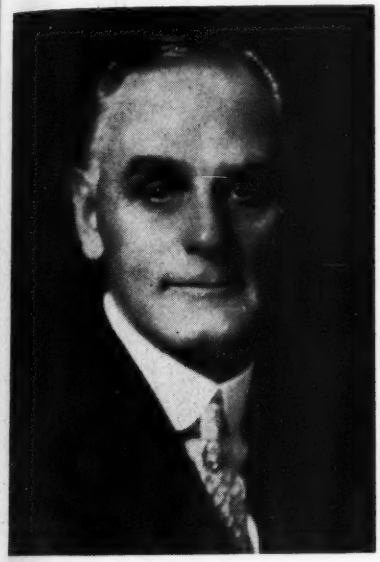
Mr. Fuller entered the employ of Bethlehem at the close of the First World War. In 1936 he became assistant manager of sales for the New York district and two years later was appointed district sales manager.

He was born at Shelter Island, N. Y. Following graduation from Amherst College, Class of 1917, he served as a first lieutenant in the U. S. Army Air Force. He is married and has a daughter.

The company's West Coast headquarters are at 20th and Illinois Streets, San Francisco, California.

Death Calls Charles B. Barnes

Charles B. Barnes, retired vice-president of The National Supply Company and one of the key figures in the development of the company's nation wide sales organization, died on June 1, 1944. Death attributed to heart failure, occurred at his home in Los Angeles, California. He was 88 years old.



Charles B. Barnes

Charlie Barnes' part in the development of the merchandising organization of The National Supply Company had its inception at the turn of the century and made for a remarkable career that included many industrial, financial, religious and philanthropic activities.

Starting with the company on February 27, 1901, Barnes soon became manager of the California National Supply Company, the western subsidiary of the National Supply Company. His appointment marked the beginning of an extensive sales organization for the company with oil well supply stores located throughout the state of California wherever oil was produced.

Barnes was later named vice-president of The National Supply Company and the successful sales organization he developed included California field stores at Los Angeles, San Francisco, McKittrick, Maricopa, Taft, Brea, Orcutt, Long Beach, Huntington Beach, Sisquoc, Bakersfield, Coalinga and Santa Fe Springs.

Although he retired 18 years ago at the age of 70, Mr. Barnes retained a keen interest in the company's progress until his death.

California Drills 251 Exploratory Test Wells In 1943

During 1943 two hundred and fifty-one exploratory test holes were drilled in California representing a total footage of 1,064,088 feet. The average depth per hole was 4,239 feet.

Of the 251 holes drilled, 44 resulted in oil wells with a combined drilled footage of 197,965 feet.

Thirteen gas wells were found. The footage drilled was 76,978 feet.

One hundred and ninety-four dry holes were drilled. These represent a footage of 798,145 feet.

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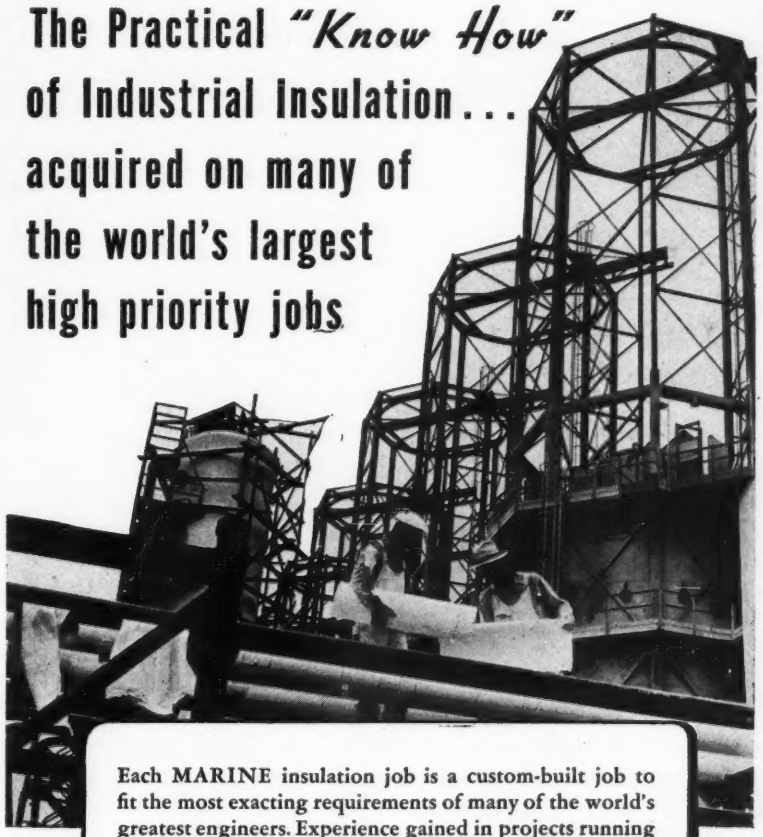

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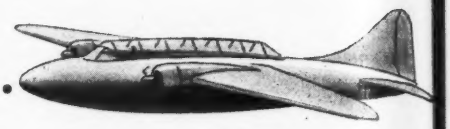

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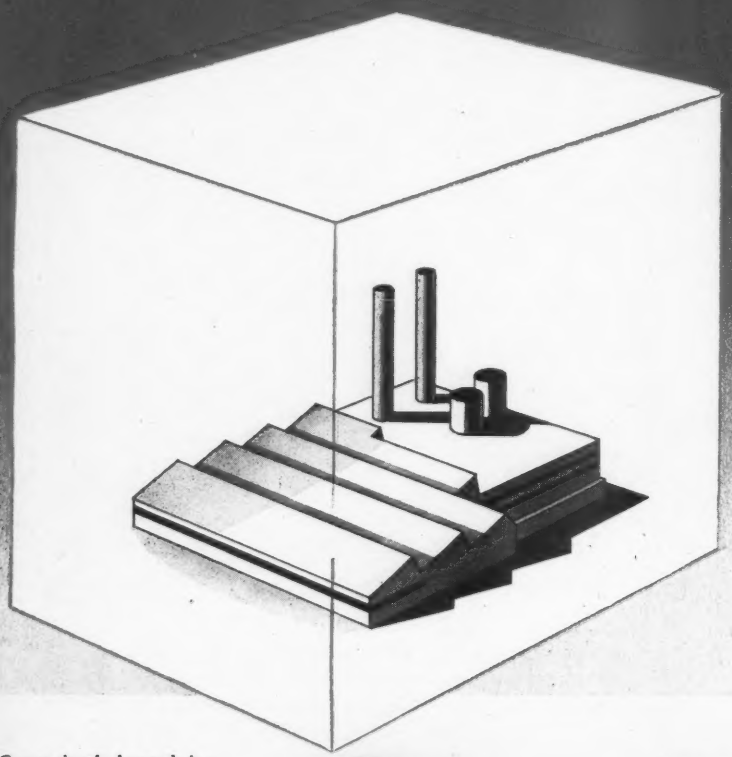

Perhaps few of chemistry's modern discoveries are as important to the war effort or will impart as great an impact on future business, industry and domestic life, as plastics. Few products parallel plastic's long range of quality, from rubber softness to steel hardness. And its uses challenge the imagination.

The oil industry is playing an increasingly important part in the production of plastics. Many of them depend on oil products for their ingredients.

Another product, of increasing importance to the oil industry is Tret-O-lite, the compound that simplifies the producer's emulsion problems, regardless of how tough they may be. For years, Tret-O-lite has been recognized as the leading treating agent for "cut" oils.

Conveniently located, is a Tret-O-lite field engineer, whose background and firing-line experience merit your complete confidence. Call him to help on your next emulsion problem.

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Tret-O-lite
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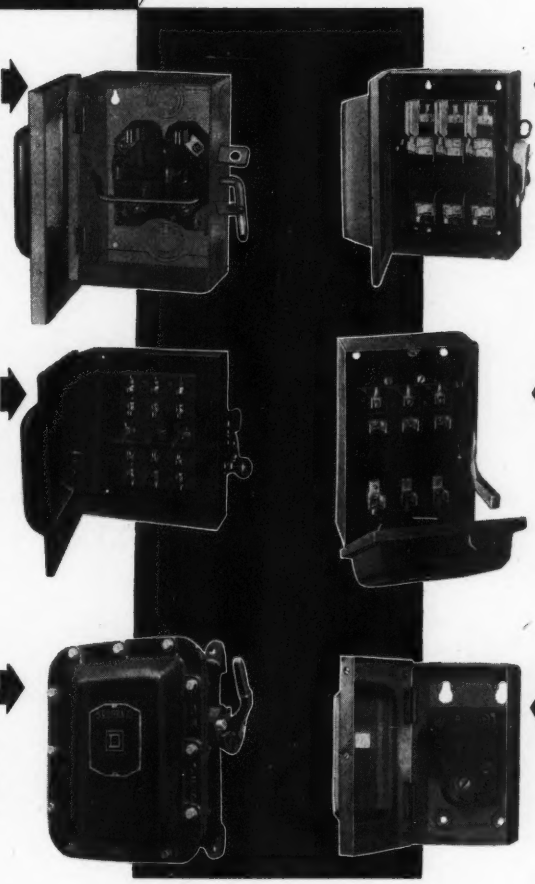
DEHYDRATING **DESALTING**

a Complete Line of safety switches



General Purpose Switches (Type D) are quick break only in capacities from 60 to 600 amperes inclusive. Thirty-ampere (and rain-tight) switches are not quick break. Made with 2, 3 and 4 pole and 2, 3, 4 and 5-wire s/n systems. 230 volt A.C. and 250 volt D.C.

Type C Industrial Safety Switches are quick make and quick break. Made up to and including 600 amperes, 600 volt. Fusible and not fusible. Horsepower rated. 2, 3 and 4 poles, and 3, 4 and 5-wire solid neutral. Also available in rain-tight enclosures.

Double Throw Switches. Made in sheet steel or explosion-resisting enclosures, approved for Class 1, Group D hazardous locations. Interlocked covers and quick make and quick break mechanism in sheet steel enclosures.

Type A Switches with concealed blades. Quick make, quick break and interlocked cover. Design permits smaller boxes with plenty of wiring space. Up to 200 amperes, 600 volts. H.P. rated. Made in 2 and 3 pole, 3 and 4-wire solid neutral.

Weatherproof, dust-tight and explosion-resisting enclosures are available with ratings up to 200 amperes. Dust-tight switches approved for Class 11, Group G hazardous locations. Explosion-resisting enclosures approved for Class 1, Group D hazardous location.

Blue Label Line—Type D Switches are compact, employing a rotary type of blade construction. Made for 2 pole and 2-wire and 3-wire, 230 volt A.C.-250 volt D.C. systems. Available for 30 to 60 ampere fusings. Front operated.

SQUARE D's unusually complete line of safety switches covers five divisions: *1.* Heavy Duty Industrial Type A. *2.* Intermediate Industrial Duty Type C. *3.* General Purpose (Type D). *4.* Double Throw Switches. *5.* Manual Motor Starters.

The predominance of Square D switches throughout industry speaks volumes for their performance.

CALL IN A SQUARE D FIELD ENGINEER

If you have a problem which involves electrical control or distribution, you're welcome to the counsel of the nearest Square D Field Engineer. He is in constant contact with plants of every kind. He studies methods and applications with the idea of simplifying new jobs or doing old ones better.

ELECTRICAL EQUIPMENT • KOLLSMAN AIRCRAFT INSTRUMENTS

SQUARE D COMPANY

LOS ANGELES 21 • SAN FRANCISCO 3 • SEATTLE 1 • DENVER 4
DETROIT 11 • MILWAUKEE 2

Gas Co. Unit

(Continued from Page 27)

the plant. These boilers provide the butadiene plant with about a million pounds of steam per hour. Two boilers are currently being installed and will augment the present supply by 100,000 pounds per hour.

Four low pressure compressors are used to compress gas from the generator plant to 50 pounds per square inch. A Hortonsphere receives this gas. New high pressure compressors take it and raise its pressure to 185 pounds per square inch.

The high pressure gas enters the absorption plant where butadiene and other hydrocarbons are separated from the residue gas by absorption in oil in the absorbers. Part of the residue gas is used for plant fuel; the remainder enters the gas mains serving the city of Los Angeles. The butadiene and other valuables are removed from the absorption oil by heating and fractionating in stripping columns. The butadiene and butenes are separated from the other valuables in the depropanizer and debutanizer. At full capacity, 100 tons of butadiene with 100 tons of butenes are shipped daily via pipe line to Shell Chemical Company.

The oil distillates from the refineries are high in sulfur. This sulfur is partly converted to hydrogen sulfide in the generators. Hydrogen sulfide is undesirable both in the plant and in the gas company mains. It is removed by passing the gas into the largest oxide boxes in the world. These boxes are packed with wood chips coated with iron oxide. Each box holds about 50,000 bushels of these coated chips.

Carrington King

(Continued from Page 3)

Eight record achievements were enumerated by Robert E. Wilson, chairman of PIWC's Committee on Petroleum Economics, as follows:

"1. Crude oil production averaged approximately 4,560,000 barrels per day—50,000 barrels a day more than in May and almost 600,000 barrels per day higher than June a year ago.

"2. Daily average crude runs to refineries of the United States amounted to 4,620,000 barrels, which is about 200,000 barrels a day more than the previous month and about 800,000 barrels per day more than in June, 1943.

"3. United States production of 100-octane gasoline and its various ingredients reached a new high—the major factor in the 500,000 barrels daily of this product now being produced by the United Nations.

"4. Total domestic production of all gasolines amounted to about 2,020,000 barrels daily, and of this amount a greater portion than ever before was special high quality material for the military services. June was the first month in which domestic gasoline production has averaged more than two million barrels a day. In June, 1943, the daily output was 1,558,000 barrels a day and practically every month since then has established a new high in gasoline production.

"5. Production of heavy industrial fuel oils, including special Navy grade fuels, exceeded all previous production records, as did that of the gas oil and distillate fuel oil, including special Navy Diesel fuels.

"6. June witnessed a new high in the total of butadiene made from petroleum for use in rubber manufacture.

"7. During the same month movement through both the 20" and 24" war emergency pipe lines to the East Coast of the United States reached a new high record, as did the over-all quantity of crude oil and products received through all pipe lines into the eastern coastal area.

"8. The largest total quantity of petroleum and products ever moved to the Atlantic Seaboard district in any one week was exceeded twice during June. The amount moved to this area by sources other than tankers was just about equal to the maximum amount ever moved to the East Coast by tanker during any prewar month, when about 95 per cent of all crude petroleum and products used in this area was brought in by tanker transportation."

Johnston Stainless Steel Welding Rods

Fully Meet Specifications, and Are Satisfactory in Welding

A. P. JOHNSTON

1845 E. 57th St.—Los Angeles 11, Calif.

KImball 2508

THIS LAUGH OFF!!

"My boy," said the business man to his son, "there are two things which are vitally necessary if you are to succeed in business."

"What are they, dad?"

"Honesty and sagacity."

"What is honesty?"

"Always—no matter what happens, nor how adversely it may affect you—always keep your word once you have given it."

"And sagacity?"

"Never give it."

A Frenchman, struggling with the English language, turned to an American friend for counsel:

"What," he asked, "is a polar bear?"

"Polar bear? Why he lives away up north."

"But what does he do?"

"Oh, he sits on a cake of ice and eats fish."

"Zat settle! I will not accept!"

"What in the world do you mean, you won't accept?"

"Ah," explained the other, "I was invited to be a polar bear at a funeral, and I will not accept!"

"What can you tell me about King Solomon?" a little girl was asked by her Sunday school teacher.

"He was a very wise king and very fond of animals."

"Fond of animals?" asked the teacher. "What do you mean?"

"Why, in the Bible it says he had 700 wives and 300 porcupines."

At a little service station away out in the Mojave desert there hangs a sign bearing this pathetic legend: "Please don't ask for information. If we knew anything, we wouldn't be here."

"How do you know my wife entertained other men while I was out of town?"

"If you promise not to shoot me, I'll tell!"

Wife: "My husband talked in his sleep last night."

Office Girl: "Well, what does that make me?"

Wife: "It makes you his ex-stenographer."

Boresome Husband :"Let's have some fun this evening."

Bored Wife: "O. K., and please leave the light on in the hallway if you get home before I do."

Wife (to absent-minded professor): "Your hat is on the wrong way, dear."

Professor: "How do you know which way I'm going?"

I never kiss, I never neck,
I never say hell, I never say heck.
I'm always good, I'm always nice,
I play no poker, I shake no dice.
I never drink, I never flirt,
I never gossip or spread on dirt.
I have no line or funny tricks,
But what the 'ell, I'm only six!

A beautiful lady lay on her cot in the receiving ward of a hospital, her only covering a large white sheet. A young man in white, while passing, was struck by the lady's lovely features. He stopped, drew back the sheet, and examined the patient from head to foot.

"Do you think you will have to operate?" the girl asked anxiously after a few minutes.

"Well—I don't know," was the reply, "but I'll ask the doctor."

"I'm knitting something to make the sailors happy."

"A sweater?"

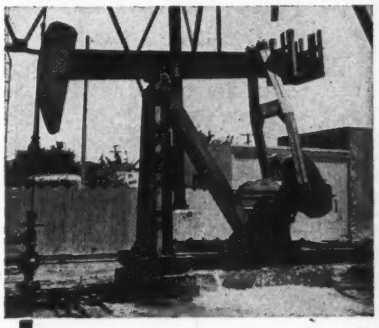
"No, a bathing suit for me."

The army doctor was questioning the new nurse about a soldier patient: "Have you kept a chart on his progress?"

The nurse blushingly replied: "No, but I can show you my diary!"

Don't you know that you should always give half of the road to a woman driver?

I always do, when I find out which half of the road she wants.



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Field Development

Los Angeles Basin

Imperial Activity

The Pure Oil Co. Truckhaven Unit No. 1, is bottomed in basement rocks at the total depth of 5863 ft. after finding the top of the basement complex at 5830 ft. The operators are now running an electric log and will determine their future proceedings from the findings shown on the log. Approximately six miles south of this well in section 27-11s-9e, the Standard Oil Co. Southern Land Co. No. 1, is spot coring ahead in hard shale below 4500 ft. Minor showings of gas were reported in recent cores. Across the lake, northeast from these wells, O'Quinn and Hadley have spudded All American Acres Comm. No. 1. Located in section 11-9s-12w, this shallow test hole is now drilling ahead below 700 ft.

Standard Testing

Midway between the Athens-Rosecrans field and the Dominguez field, the Standard Oil Co. is running a formation tester into Bell Comm. No. 1. Located in section 29-3s-13w, the hole is currently bottomed at 8570 ft. and is probably testing showings found in what is either the seventh or eighth Callender zones. The operator is withholding all detailed information on the well.

Outpost All Water

The Shell Oil Co. Bank No. 3, outpost well on the westerly flank of the Athens - Rosecrans field is pumping salt water with a trace of oil. Located in section 8-3s-13w, the hole was bottomed in oil sand at the total depth of 8696 ft. after setting a seven inch water string at 8190 ft. A 5½ inch perforated liner was landed at 8691 ft. and an attempt made to place the well on production. On the pump the well started off making oil at a 120 barrel per day rate with a gross cut of 40 percent. This rapidly declined and at the end of five days the well was making salt water with a trace of oil. The operator plans to pump the well for a few days and then run a water witch.

Discovery Well Recompleted

Union Oil Co. Howard Park No. 1, discovery well of the Athens-Rosecrans field, has just been recompleted from the Zinns zone for an initial production of 190 barrels per day of 33 gravity clean oil, flowing through a one inch bean with 50 pounds tubing pressure and 200 pounds casing pressure. The gas production was gauged at 405 MCF per day. Located on the northwest corner of 131st St. and Figueroa, the well was originally drilled in 1922 to a depth of 4971 ft. The hole was recently deepened to 6283 ft. and the Lower Zinns zone gun perforated through 5½ inch casing from 6158 ft. to 6247 ft.

Aliso Canyon Extended

Approximately ½ mile northwest from the known producing limits

LOS ANGELES BASIN WILDCATS

Area	Well	No.	Section	Depth	Status
Athens	J. Paul Getty, Westmore	1	2, 3-14	9108	Rigging pump
Aliso Canyon	Barnsdall-Bandini Pet. Co., Roosa	1	29, 3-16	9362	Completed
	Standard Oil Co., Frew	1-2	29, 3-16	9339	Testing
	Standard Oil Co., Del Aliso	1	29, 3-16		Prep. to spud
	Standard Oil Co., Ward	3-1	27, 3-16	1305	Drilling
Dominguez	Macmillan Pet. Corp., Carson	1	35, 3-13	7463	Drilling
El Segundo	Pauley, H. R. & E. W., Loftus	1	11, 3-15	7291	Redrilling
	Richfield Oil Corp., Lenzinger	1	8, 3-14		Location
Hasley Canyon	Shell Oil Co., Inc., Claiborne	88-4	4, 4-17		Rigging up
Inglewood	Shield Pet. Co., Well	1	18, 2-14	307	Drilling
Las Llajas	Standard Oil Co., Brady Est.	2-1		1409	Drilling
Loma Verde	Shell Oil Co., Shell-Cont.	86-20	20, 5-17	7006	Abandoned
Newhall	Pet. Expl. Co., Kraft	1	31, 4-15		Rigged—Idle
Norwalk	Gen. Pet. Corp., Comm.	14-1	7, 3-11	7520	Abandoned
Pico Canyon	Standard Oil Co., Pico Co.	42	1, 3-17		Rig
Puente	Alleghany Pet. Co., Rowland	1	14, 2-10		Rigging up
	Hansen, Melvin, Corehole	3	24, 2-10	1900	Testing wso
Rosecrans	Standard Oil Co., Bell Comm.	1	29, 3-13	8570	Testing
Turnbull Canyon	Capital Co., Cole	1	11, 2-11	2935	Idle
	Capital Co., Baldwin	2	11, 2s-11w	1285	Completed
Whittier	Mayo Oil Co., Grey	1	17, 2-11		Location
	Orange County				
Buena Park	Gen. Pet. Corp., Heath	1	34, 3-11	11178	Coring
Costa Mesa	Lovelady & Frambes, Destiny	1	9, 6-10	1750	Coring
E. Coyote	Barnsdall Oil Co., Sunny Hills	2	22, 3-10		Rig
Placentia	Providence Oil Co., Chapman	1	36, 3-10	4817	Drilling
	San Bernardino County				
Chino Hills	Chino Hills Oil Co., Kraemer	1	33, 2-8	1820	Drilling
Hesperia	Salter, Lee, Weil	1	34, 4-5		Rigging up
	Wm. Y. Lee, Corehole	2	21, 2-8	3010	Bailing
	San Diego County				
Waterman Cyn.	La Jolla Pet. Co., Well	1	32, 15-3		Location
	Imperial County				
Salton Sea	O'Quinn & Hadley, All Am. Acres Comm.	1	11, 9-12	620	Drilling
	Pure Oil Co., State	1	26, 10-9	5863	Rng. elec. log
	Standard Oil Co., Southern Land Co.	1	27, 11-9	4470	Drilling

of the Aliso Canyon field, the joint test of the Barnsdall Oil Co. and the Bandini Pet. Co. has been placed on production. The well Roosa No. 1, produced initially, 63 barrels per day of 18 gravity oil cutting nine percent, flowing by heads through a 10/64 inch bean with 80 pounds flow pressure. Located near the north ¼ corner of section 29-3n-16w, the hole was drilled to the total depth 9362 ft., plugged back and completed from the Sesnon zone between the depths of 8317 ft. and 8402 ft.

Axis Testing Main Zone

On the southerly flank of the Torrance field, the Axis ePt. Co. is repairing a leak in the seven inch water string after the well pumped all water on the first production test. The well, No. J-1, found 35 ft. of oil sand in the Del Amo zone at the total depth of 5264 ft. However it was not thought to be worthy of a test and the hole was plugged back to 3715 ft. A string of seven inch casing was cemented over the Main zone at 3620 ft. and a 4¾ inch perforated liner conventionally gravel packed in the hole. On the pump, the well showed only salt water with a trace of oil and a hole was located in the water string at 2975 ft.

G. P. Abandons Norwalk "Cat"

Northwest of the town of Norwalk, near the west ¼ corner of section 7-3s-11w, the General Pet. Corp., has abandoned Comm. 14 No. 1. Originally drilled to 6230 ft., the hole was plugged to 3000 ft. and directionally drilled to the north, to a total depth of 7520 ft. There were no showings of either oil or gas found in the hole.

A. L. Tull Stakes San Diego "Cat"

The La Jolla Pet. Co., a new company formed by Dr. A. L. Tull of San Diego, has staked location and is preparing to drill La Jolla No. 1, on projected section 32-15s-3w. The location falls in the Waterman Canyon area of San Diego county approximately 1100 ft. northwest of the A. L. Tull Capital No. 1, which was abandoned in Schist at the total depth of 6130 ft.

Shield Pet. Spuds Inglewood Outpost

The Shield Pet. Co. has spudded well No. 1, on the southwesterly flank of the Inglewood field and are currently drilling ahead below 500 ft. Located in section 18-2s-14w, southwest from the intersection of Hill St. and Overland Ave. the well is being drilled to test the deep Sentous zone which is produced in the Inglewod field.

Pauley Redrilling

The Pauley Brothers Loftus Land Co. No. 1, is fishing drill pipe after setting a whipstock and redrilling to 7105 ft. Located northwest of the town of El Segundo, in section 11-3s-15w, the well was originally drilled to a total depth of 7291 ft., plugged back and completed on the pump from the interval 7030 ft. to 7214 ft. After producing for a short time at a 70 barrel per day rate, the 5½ inch perforated liner was found to be collapsed.

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Coastal and Northern Districts

Superior Tests Corning "Cat"

In the Corning area of Tehama county, the Superior Oil Co. is coring ahead in Saldubehere No. 1, after making a production test of a gas zone found between the depths of 3800 ft. and 4070 ft. The company has released no information on the test but reliable observers estimated the blow at various rates from 9000 MCF to 12,000 MCF per day. Located in section 12-24n-3w, southeast from the town of Richfield, the well is now drilling in shale below 4500 ft.

Joint Test Promising

The joint test being drilled by the Union Oil Co. and the General Pet. Corp. is showing considerable gas and the operators have cemented a string of 5¾ inch casing at 1720 ft. Located in the Colusa area of Colusa county, in section 27-16n-1w, the hole is currently bottomed in shale at the depth of 2600 ft. The weight of the mud in the hole is being carried at 105 pounds per cubic ft. to control the high gas pressure and salt water flow which the well has shown.

Standard Abandons Stockton "Cat"

Southeast of the town of Stockton, the Standard Oil Co. has abandoned Fair Oaks A Comm. No. 1. Located in section 19-1n-7e, the hole was drilled and cored to the total depth of 6500 ft. where the formation was Cretaceous shale. There were no showings of either oil or gas at any point in the well.

Wilshire Stakes So. Mountain "Cat"

The Wilshire Oil Co. is moving in rig material for their second test of the Petit property midway between the South Mountain field and the Bardsdale field. The location reported is 200 ft. northerly and 125 ft. westerly from the southeasterly corner of the Petit property in section 9-3n-20w, approximately 2000 ft. south of Petit No. 1, which was drilled and abandoned last year.

Joint Test Located

Approximately two miles west of the South Mountain field, the Los Nietos Co. and the Honolulu Oil Corp. have joined forces and are grading roads and location for U. S. No. 1. The hole will go down near the west ¼ corner of section 22-3n-21w, with a fault accumulation on the westerly plunge of the South Mountain anticline as the objective.

Santa Maria Completions

In the Santa Maria Valley field, W. R. Girard completed Acquistapace No. 4, flowing at the initial rate of 1200 barrels per day of 16 gravity clean oil. Located in section 22-10n-34w, the hole was bottomed at 4673 ft. and is producing from 762 ft. of perforations between the depths of 3900 ft. and 4670 ft. In this same section Acquistapace No. 5, is drilling ahead after cementing a string of seven inch casing at 3850 ft. On section 35n-10n-34w, the Five "C" Refining Co. has completed Nelson No. 2, for an initial rate of 600 barrels per day. Producing from 605 ft. of zone between the depths of 4945 ft. and 5550 ft. In section 21-10n-34w, the Union Oil Co. F. Vicente No. 8, was bottomed in Franciscan at the total depth of 5069 ft. and completed for an initial production of 425 barrels per day of 18 gravity oil cutting 16 percent. The zone open in the well is from 4565 ft. to 5069 ft.

Deep Test Grading

In the Rincon field, the C.C.M.O. Co. is grading location for another 10,000 ft. hole. To be known as Hobson "C" No. 11, there will be no accurate location available until after the grading is completed.

Standard Fishing

Northwest of the town of Fillmore, the Standard Oil Co. continues to fish for stuck drill pipe in the deep test well Fillmore Comm.

COASTAL COUNTIES WILDCATS

Area	Well	No.	Section	Depth	Status
	Santa Barbara County				
Cat Canyon	Richfield Oil Corp., Los Flores	1	10, 8-33	6487	Drilling
E. Cat Canyon	Union Oil Co., McNee, C. H.	2	20, 9-32	4032	Pumping
	Union Oil Co., McCroskey, C. H.	1	20, 9-32	3150	Drilling
Lompoc	S. R. Williams, Fickert	1	8, 7-33	3435	Fishing
Los Alamos	J. I. Anderson & So. Calif. Pet. Corp., Archambeault	2	3, 7-32	2110	Drilling
Los Olivos	Hub Oil Co., La Laguna	1	7, 7-30	3580	Cleaning out
Purisima	Whittier Assoc., Barham	2	11, 7-32	2300	Drilling
Sta. Rosa Ro.	The Texas Co., Petan	2	20, 6-32	2111	Abandoned
	Ventura County				
Devils Anticline	Shell Oil Co., Rogers C. H.	B	22, 5-18	2719	Drilling
Eureka Canyon	El Rika Oil Co., Well	7	33, 4-18		Location
Fillmore	Standard O. Co., Fillmore Comm.	2-1	24, 4-20	14512	Fishing D.P.
Piru	Delroy Pet. Corp., Lisk	3	22, 5-18	3149	Pumping water
	Standard Oil Co., Bowman	2-1	14, 4-18	7007	Drilling
Sespe	Volunteer Pet. Co., Tar Creek	3	28, 5-19	2185	Drilling
	Merchants Pet. Co., Well	9	1, 4-20		Rig
South Mt.	Pac. West. O. Corp., M. Richardson	1	24, 3-21	4110	Drilling

NORTHERN COUNTIES WILDCATS

County	Well	No.	Section	Depth	Status
Butte	Richfield Oil Corp., Hamilton-Nord	1	9, 22n-1w		Rig
Colusa	Standard Oil Co., Princeton	1	24, 18n-2w	4410	Drilling
	Union & Gen. Pet. Corp., Capital	2	27, 16n-1w	2600	Drilling
Sacramento	Amerada Pet. Corp., Capital Co.	2	2, 6n-2e		Rigging up
San Benito	Panoche Pet. Co., Panoche	1	24, 16s-10e	650	Idle
San Joaquin	Standard Oil Co., Fair Oaks	A-1	19, 1n-7e	6500	Abandoned
San Mateo	Richfield Oil Corp., Lena Souza	1	13, 7s-5w	948	Drilling
Solano	Amerada Pet. Corp., Starkey Fee	1	2, 6s-2e	9434	Resuming
	Standard Oil Co., Suisun	3	5, 3n-1w	4019	Drilling
	Standard Oil Co., Fontana	1	23, 3n-1w	6340	Drilling
Tehama	Richfield Oil Corp., Gallitan	1A	26, 25n-3w	4110	Testing
	Superior Oil Co., Saldubehere	1	12, 24s-3w	4463	Testing
	The Texas Co., Jelly-Bend	18-8	8, 29n-2w		Grading

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GOOD NEWS!
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No. 2-1. Located in section 24-4n-20w, the hole was drilled to 14,512 ft. and redrilled from 11,535 ft. to 12,860 ft. where the drill pipe is frozen. The operator is currently bailing from inside the drill pipe in an attempt to break circulation.

Elwood Field Extended

The Signal Oil and Gas Co. has completed State No. 129-1, on the recently acquired State Tideland permit northwest of the Elwood field. Located in section 16-4n-29w, the hole was directed under the Tidelands approximately 1500 ft. south of the surface location to a measured depth of 5113 ft. A string of 8⅝ inch casing was cemented at 4550 ft. and a 6⅝ inch perforated liner landed at 5101 ft. Approximately 7000 barrels of oil were lost into the formation making the current production figures worthless as an indication of the potential of the zone. Completed on the gas lift, the well produced initially at the rate of 1200 barrels per day with 375 pounds injection pressure. The current production is 288 barrels per day of 34 gravity clean oil, through a 28/64 inch bean with 150 pounds on the tubing and injecting gas under 390 pounds pressure into the casing.

Texaco Abandons Petan Test

In the Santa Rosa Ranch area of Santa Barbara county, The Texas Co. has abandoned their second test of the district, Petan No. 2. Located in section 20-6n-32w, the hole was bottomed in hard Cretaceous shale and sandstone at the total depth of 2111 ft. There were no showings found at any point in this well which is approximately 1500 ft. northwest from Petan No. 1, which was drilled to a depth of 1740 ft. and abandoned last year. The operator has no additional plans for prospecting in this area.

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Paloma Completions

In the Paloma field on section 34-31s-26e, the Western Gulf Oil Co. has completed Paloma Unit No. 15-34. Drilled to a total depth of 10,942 ft., a string of seven inch casing was cemented at 10,941 ft. and gun perforated in five stages between the depths of 10,520 ft. and 10,880 ft. On the initial gauge the well produced 869 barrels of 48 gravity oil cutting 0.1 percent, flowing through a 28/64 inch bean with 1300 pounds tubing pressure and 2200 pounds casing pressure. The gas rate was gauged at 6045 MCF per day. The well is currently flowing 804 barrels per day through a 16/64 inch bean with 2600 pounds tubing pressure and 2250 pounds casing pressure. On this same section Paloma Unit No. 66-34, was completed for an initial production of 777 barrels per day of 32 gravity oil, flowing through a 32/64 inch bean with 500 pounds tubing pressure and 1800 pounds casing pressure. The well is producing from four stages of gun perforations between the depths of 10,710 ft. and 11,020 ft. Total depth of the hole is 11,073 ft.

Elk Hills Activity

The Standard Oil Co. is getting away to a fast start with their current drilling program in the Elk Hills field. The first well, No. 43-34S, has been bottomed at the depth of 3031 ft. and is being bailed preparatory to placing on the pump. In this same section, well No. 18, 38 and 112 are rigging up. All are located in section 34-30s-23e. In section 27-30s-23e, well No. 58-27S, is running electric log after coring to the total depth of 3211 ft. And in section 33-30s-23e, well No. 54-33S, is running 8⅝ inch casing, with the present depth of the hole at 2720 ft. while well No. 48-33S and No. 74-33S are rigging up. This all adds up to eight strings of tools already at work on the U. S. Navy Petroleum Reserve lands, which number the operator intends to increase to 15 in the very near future.

Bandini Coring

Approximately two miles west of the northwesterly producing limits of the South Belridge field, the Bandini Pet. Co. is coring shale with streaks of gray sand in Bacon No. 1. Located in section 27-28s-20e, the hole is currently being drilled below 6300 ft. The operator is withholding all information on the well other than the depth.

Superior Completes Southeast Greeley Well

The Superior Oil Co. has completed the second well in the recently discovered field on the southeasterly extension of the Rio Bravo-Greeley fold. Located in section 35-29s-26e, Houghton No. 47-35, showed an initial production of 435 barrels per day of 37 gravity oil cutting less than one percent, flowing through a 16/64 inch bean with 860 pounds flow pressure. The gas production was rated at 275 MCF per day. The hole was drilled and cored to a total depth of 8717 ft. and found only gray sand in the Lower Stevens zone. A string of 7⅝ inch casing was cemented at 7168 ft. and gun perforated between the depths of 6640 ft. and 6520 ft. One location northeast from this well the operator is rigging up on Houghton No. 56-35.

Kern Bluff "Cat" Abandoned

Northeast of the town of Bakersfield, in the Kern Bluff area, the Independent Exploration Co. has abandoned Trust No. 21. Located in section 14-29s-28e, the hole was bottomed in gray sand at the total depth of 1720 ft. after finding the top of the Santa Margarita formation at 1610 ft.

Deep Test Rigging

Near the northerly boundary of Kern county, southeast of the Trico

SAN JOAQUIN VALLEY WILDCATS

Area	Well	No.	Section	Depth	Status
	Fresno County				
Cantua	Seaboard-Pure Oil Co., Well	54-22	22, 16-13	4286	Drilling
Jacalitos	Standard Oil Co., Wells Fargo	1	30, 21-15	3361	Abandoned
	Tide Water Assoc. Oil Co., Jacalitos	27-16	16, 21-15	3885	Completed
	Kern County				
Ant Hill	Amerada Pet. Corp.,Ant Hill,S.P.	36-15	15, 29-29	2225	Bailing
Arvin	Continental Oil Co., Derby	1	35, 31-29	5577	Drilling
Devils Den	C.C.M.O. Co., Bates	2	20, 25-19		Rig
	DeKalb & Foster, Le Baron	5	24, 25-18	1315	Idle
Gosford	T. W. A. Oil Co., KCL	44-22	22, 30-26	8152	Swabbing
McKittrick	Americal Pet. Corp., Americal	1	2, 30-31	5450	Redrilling
	Richfield Oil Corp., Olig	2	12, 30-21	1473	Abandoning
Lost Hills	Standard Oil Co., Cahn	58-4	4, 27-21		Location
McVan	Butler Bros., Well	2	14, 27-27		Grade
	Morrison, B. C., Well	1	4, 27-27	4210	Drilling
Midway	C.C.M.O. Co., Well	G-3	20, 32-33		Rig
	Std. Oil Co., Ethel D. S.	1	36, 12-24	8586	Drilling
Mt. Poso	Anderson, Giffen & Anderson, Durnal	1	24, 27-28	188	Drilling
Rosedale	Western Gulf Oil Co., KCL-A	37-14	14, 29-26	10283	Drilling
Round Mt.	Bandini Pet. Co., Bishop-Mills	7	24, 28-28	2308	Abandoned
	Signal Pet. Co., S. P.	2	25, 28-28	2813	Abandoned
	Signal Pet. Co., Russell	1	26, 28-29	90	Drilling
Semitropic	Standard Oil Co., Fullerton	1	25, 27-23	9886	Drilling
Shafter	T.W.A. Oil Co., Shafter Comm.	86A-7	7, 28-25	11079	Drilling
So. Belridge	Bandini Pet. Co., Bacon	1	27, 28-20	6310	Drilling
Strand	Standard Oil Co., Robbins	45-35	35, 29-26	5420	Drilling
	Superior Oil Co., Houghton	47-35	35, 29-26	8717	Completing
Stockdale	W.G.O. Co., KCL	77-5	5, 30-27	9818	Drilling
Sunset	T. W. A. Co., McBean	86-36	36, 12n-23w		Rigging up
Tejon	Reserve Oil and Gas Co., Well	33-7	33, 11-19		Rigging up
	Richfield Oil Corp., S. P. 10	15-15	15, 11-19	1046	Drilling
Temblor	K & G Drilling Co., Well	2	25, 29-20	666	Abandoned
Ten Section	Richfield Oil Corp., Old River-KCL	1	3, 31-26	9191	Abandoning
Trico	Magee, H. H., Opr., Amal-Happold	2	15, 25-24		Prep. to spud
	Kings County				
Alpaugh	Standard Oil Co., Von Glahn	1	34, 23-22	4261	Drilling
	Madera County				
Gill Ranch	The Texas Co., Gill	725-19	19, 13-16	4320	Drilling

gas field, Harry H. Magee, Operator, is rigging up on Amalgamated Happold No. 2. The location of the well, which will be a deep test of the area is, 1980 ft. north and 660 ft. east from the southwest corner of section 15-25s-24e. It will be remembered that Mr. Magee was instrumental in the discovery and development of the Trico gas field.

Tide Water Completes Jacalitos Discovery

The Tide Water Assoc. Oil Co. has discovered a new oil producing area midway between the Jacalitos field and the south end of the Coalinga field. Jacalitos No. 27-16, flowed initially at the rate of 1140 barrels per day of 33 gravity clean oil through a 28/64 inch bean from the total depth of 3885 ft. Located near the southwest corner of section 16-21s-15e, the hole was cored to the total depth of 3885 ft. after setting a string of 6⅝ inch casing at 3600 ft. and testing showings found from 3607 ft. to 3700 ft. Only small amounts of oil were recovered on the tests and the hole was drilled and cored ahead to the present bottom. A 5 inch liner including two stages of perforations was landed at 3883 ft. and cemented through perforations at 3802 ft. The well was shut in temporarily while storage was being built and is now producing 614 barrels per day of 32 gravity oil cutting 0.1 percent, flowing through a 20/64 inch bean with 840 pounds tubing pressure and 1050 pounds casing pressure. The gas production is estimated at 300 MCF per day.

Standard Protects Semitropic "Cat"

Near the southerly tip of the Semitropic gas field, the Standard Oil Co. has set a protective string of casing in Standard-Fullerton No. 1. Located near the northwest corner of section 25-27s-23e, the hole is currently bottomed in shale at the depth of 9886 ft. A protective string of 9⅝ inch casing is standing cemented at 9886 ft. The operator has recently experienced considerable trouble with gas found in the hole. That the hole will be drilled considerably deeper is indicated by the large size of the casing set. The operator has released no information on the section penetrated since passing below the known producing zones in the field.

Whittier Heights "Cat" Completed

In the Turnbull Canyon area of Los Angeles county, the Capital Co. Well, No. 2-1, has been placed on the pump for an initial production of 40 barrels per day of 19 gravity oil cutting 30 percent mud. Located northwest of the Turnbull Canyon field, in section 11-2s-11w, the hole was drilled and cored to the total depth of 1285 ft. A string of 8⅝ inch casing was cemented over the oil sand at 1109 ft. and a 7 inch liner including 189 ft. perforated landed at 1283 ft. In this immediate area, this operator is preparing to place well, Cole No. 1 on production from the plugged depth of 2000 ft., while well "B" No. 3, is preparing to spud and location is being staked for well No. 2-2.

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Richfield Abandons Ten Section "Cat"

On section 3-31s-26e, south of the Ten Section field, the Richfield Oil Corp. has abandoned Old River-KCL No. 1. Drilled and cored to a total depth of 9191 ft. the well was abandoned after finding only gray sand in the Lower Stevens zone. Considerable good looking oil sand was found in the Upper Stevens zone but yielded only a small amount of salt water when tested. The operator plans no additional development in the area at the present.

Standard Completes Coalinga Eocene Well

On the easterly flank of the Coalinga Eocene field, the Standard Oil Co. has completed well No. 24-17F, for an initial production of 435 barrels per day of 28 gravity clean oil, flowing through a 16/64 inch bean with 520 pounds tubing pressure and 900 pounds casing pressure. Located in section 17-20s-16e, the hole was bottomed in oil sand at the total depth of 8220 ft. after cementing a string of seven inch casing over the oil zone at 8009 ft. A 5½ inch liner including 205 ft. perforated was landed at 8217 ft. and a tapered string of 2½ inch and 2 inch tubing hung at 8188 ft. Southwest of this well in section 19-20s-16e, the Standard Oil Co. is fishing the liner from well No. 84-19F, after the well flowed 820 barrel per day of salt water on a production test of the Eocene sand between the depths of 7820 ft. and 7890 ft.

Deep Test Continues

The Standard Oil Co. Ethel D.S. No. 1, deep test well of the Maricopa section of the Midway Sunset field is drilling ahead and taking spot cores below 8600 ft. The operator is releasing no information on this well which is located in section 36-12n-24w.

Outpost Well Sets Casing

Approximately ½ mile northwest of the producing limits of the Paloma field the Ohio Oil Co. has casing standing cemented in KCL-A No. 11. Located near the northeast corner of section 32-31s-26e, the well was bottomed at the total depth of 10,803 ft. after finding the top of the permeable Paloma oil sand at 10,330 ft. The operator has cemented seven inch casing at 10,800 ft. and is prepared to gun perforate the oil zone in stages and place the well on production.

Bardsdale Deep Test

The Wilshire Oil Co. has erected a derrick and is preparing to drill C. E. Dryden No. 1, a deep test well on the easterly flank of the Bardsdale field.

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Ole Berg, Jr.

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He started with Union Oil Company as a messenger in the San Francisco office in 1921, and advanced through various sales jobs until 1937 when he became Northern Division Manager with headquarters in Seattle. In March, 1942, he came to Union's head office, in Los Angeles, as Assistant Sales Manager, and was promoted to Manager of Wholesale Distribution in October of that year.

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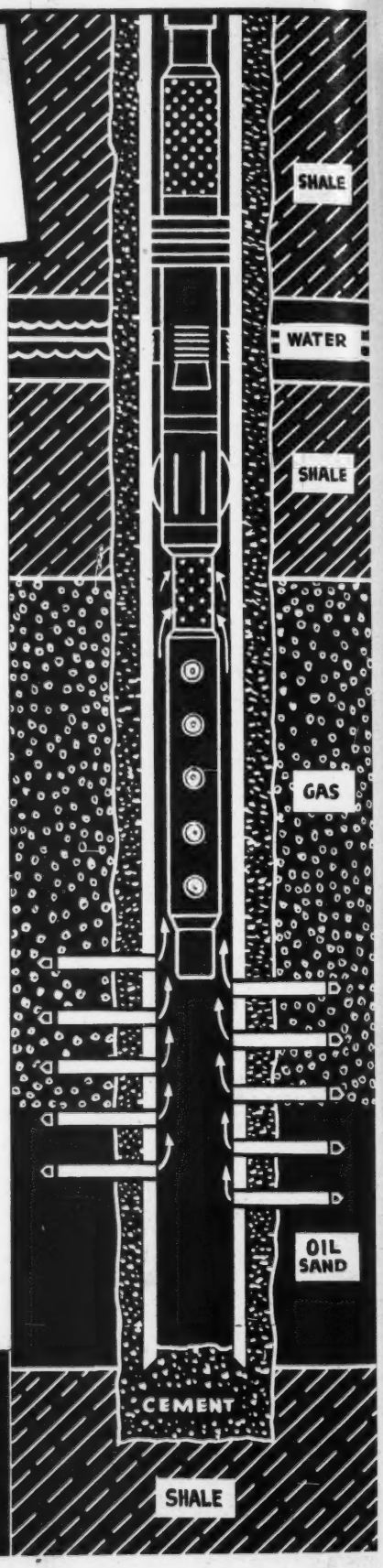

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